

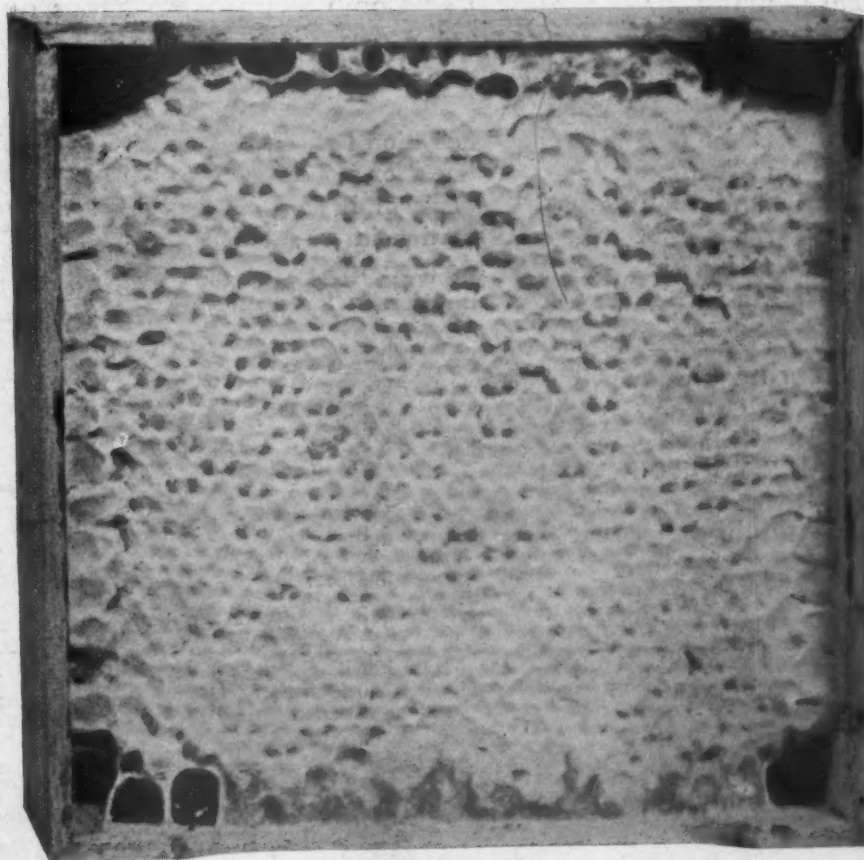
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AMERICAN BEE JOURNAL

JUNE 1923

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HONEY REGIONS OF COLORADO—By Newton Boggs

GRADING COMB HONEY—By Frank Rauchfuss

SWARM CONTROL—By Wallace Park

IS THE HONEYBEE NATIVE TO AMERICA—Some Old Writings
Discussed

A CHANGE OF HIVES—By E. M. Cole

**MUTH'S
BEEKEEPERS'
NEWS**



BETTER COMB FOUNDATION for LESS!

The great demand for Muth's Better Comb Foundation keeps our new department operating 18 hours a day. Quality, service and price are why. Think of buying at these prices

Muth's Medium Brood Foundation in 5 lb. boxes at 65c
Muth's Medium Brood Foundation in 50 lb. boxes at 60c
Muth's Light Brood Foundation in 5 lb. boxes at 68c
Muth's Light Brood Foundation in 50 lb. boxes at 63c
Muth's Thin Surplus Foundation in 5 lb. boxes at 70c
Muth's Thin Surplus Foundation in 50 lb. boxes at 65c

Wax rendering the *Muth way*. Costs you 5 cents per pound. SHIP YOUR OLD COMBS NOW AND BE SURE YOUR NAME IS ON EACH PACKAGE

We pay the highest price for honey and wax—and you get your money *right away*, without delay.

Send for our 1923 Surprise catalog. It will save you money.

Muth's Cash *sans* Agent System of Selling means lower cost to you.

LOOK AT THESE PRICES

5 10-fr. 1-story Excelsior covered hives	\$12.90
5 8-fr. 1-story Excelsior covered hives	11.90
5 10-fr. 1-story metal covered hives with inner cover	15.75
5 8-fr. 1-story metal covered hives with inner cover	15.25
5 10-fr. No. 1 supers for 4 1/4 x 4 1/4 x 1 1/8 sections	4.60
5 8-fr. No. 1 supers for 4 1/4 x 4 1/4 x 1 1/8 sections	4.10
Muth's Ideal Bee Veil	.90
100 Hoffman frames	5.90
500 Hoffman frames	27.00
500 No. 1 4 1/4 x 4 1/4 x 1 1/8 sections	6.40
1000 No. 1 4 1/4 x 4 1/4 x 1 1/8 sections	12.60
Crates of 2 60-lb. used cans, per crate	.65
(50 crates or more, at 60c)	

**THE FRED W. MUTH CO.
"The Busy Bee Men"**

CINCINNATI,

OHIO

NEW BINGHAM BEE SMOKER

PATENTED

BIG SMOKE



BIG SMOKE—WITH SHIELD
FIRE POT, 4x10

NEW BINGHAM BEE SMOKER

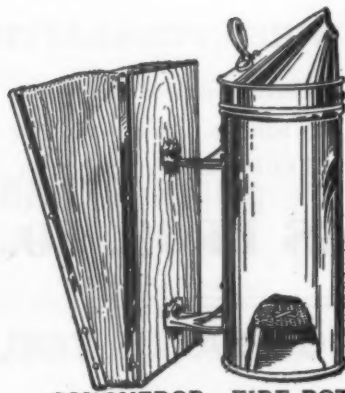


SMOKE ENGINE—FIRE POT 4x7

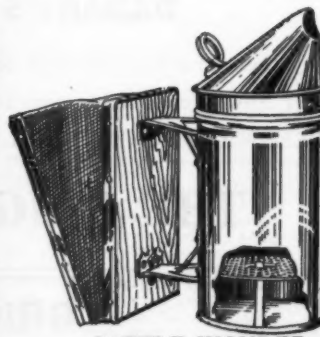
NEW BINGHAM BEE SMOKER



DOCTOR—FIRE POT 3½x7



CONQUEROR—FIRE POT 3x7



LITTLE WONDER
FIRE POT 3x5½



THE SMOKER YOU OUGHT TO OWN

THE most important invention in beekeeping, as little can be accomplished without the Bee Smoker.

The New Bingham Smoker is the most efficient and durable machine on the market.

The standard for over 40 years in this and many foreign countries, and is the all important tool of the most extensive honey producers of the world.

Comes with metal legs, metal binding and turned edges. The four larger sizes have hinged covers. The fire grate is of very substantial material, with an abundance of draft holes, the 4-inch size having 381 holes, equal to an opening 2 inches square.

A valve in the bellows of the larger sizes makes the Smoker respond to the most delicate touch.

The new Bingham comes in six sizes, including the Big Smoke, which is furnished both with and without shield. The large sizes are best, as they hold more fuel, give more smoke, require filling less often, and are especially recommended to those who work with their bees several hours at a time.

Write for our complete catalog of bee supplies and accessories. Special circular of all sizes of Bingham Smoke-ers free for the asking.

A. G. WOODMAN CO.

240 SCRIBNER AVE., N. W.

GRAND RAPIDS, MICH., U. S. A.

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SCOTT QUEENS ARE GOOD QUEENS

They sure do get the Honey! One customer writes: "Dear Mr. Scott: Got a queen from you last fall and her colony filled five supers this summer (1922). Yours truly." (Name on request). They will do as well for you.

Untested queens, golden or three-banded, 1, \$1.50; 6, \$8.00; doz., \$15. Ready June 1. Pure mating and safe arrival guaranteed. Send for circular.

THE SCOTT APIARIES, LaGrange, Ind.

IOWA QUEENS

Italian Queens of SUPERIOR Quality.

My queens are reared in strong cell-building colonies, are mated in big, strong nuclei and are first-class in every way.

1923 Prices:

Untested..... 1, \$1.25; 10 or more, \$1.15.
Select Untested..... 1, \$1.60; 10 or more, \$1.50.
Tested..... 1, \$2.00; 10 or more, \$1.90.

Will begin shipping about the 1st of June. Queens will be shipped in large long-distance cages, and I personally see that every queen is laying and in good shape when caged.

Pure mating, safe arrival and satisfaction guaranteed or your money back.

Place your order and get service and Quality.

ORIN STANLEY

Valley Apiaries, Lamoni, Iowa.

"GRIGGS SAVES YOU FREIGHT"

TOLEDO

Mr. Beekeeper, is one place where SERVICE is the watchword at all times. And such goods as LEWIS and ROOT turn out, means SATISFACTION to you.

No Misfits or Just-as-Good kinds are used by the successful bee man. Which class are YOU in?

A large and complete stock carried at all times for prompt shipment.

DADANT'S WIRED FOUNDATION—ROOT'S 3-PLY

Try them and note the fine combs made by their use.

Our New Free Catalog sent to any address. Send postal for your copy.

BEESWAX, HONEY, MAPLE SYRUP wanted. Cash or in exchange for supplies.

THE GRIGGS BROS. CO., Toledo, Ohio

"GRIGGS SAVES YOU FREIGHT"

Dept. 24.



SAVE TIME
from
BEGINNING TO END
with

DADANT'S WIRED FOUNDATION

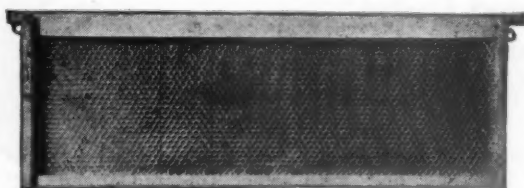
Both brood and extracting combs can be filled with wired foundation from three to four times faster than with the old-style foundation, which requires hand wiring.

From Our Files

"Am trying this foundation for the first time, and it is much easier and quicker to put in the frames.

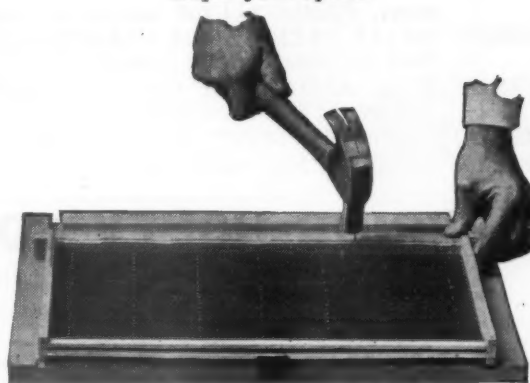
"It certainly saves time over the old method of wiring."

Iron Clad Extracting Combs



For super combs the wired foundation is desirable. No chance for breakage in extracting. No drone comb to attract the queen.

Triple your speed.



Inserting vertically wired foundation in the new style slotted bottom-bar frame.

Extracting at high speed does not damage combs.

As Others Tell It

"It is surely a good test to have new frames, Jumbo size, go through the extractor at high speed. The old style wired combs showed signs of breaking. Combs from the new style foundation stood the test as though they had been used in the brood chamber three or four years."

Right Now Time Is Honey

Dadant's Wired Foundation and slotted bottom-bar frames are sold by all distributors of Lewis "Bee-ware" and Dadant's Foundation. Send them your orders...

DADANT & SONS
HAMILTON, ILLINOIS

Makers of Dadant's Famous Foundations

WIRED—PLAIN—SURPLUS

BEESWAX—We need constantly large quantities of beeswax and pay good prices for it. We cannot use mixtures containing other waxes, as it spoils the purity of our product. Ship pure beeswax to us at Hamilton, Ill., or Keokuk, Ia., or drop us a card and we will quote f. o. b. here or your station, as you wish.

IN A HURRY?

It is now time of the year when your bees should not be deprived of supplies. Delays at this late date are costly. **TRY OUR SERVICE.**

"SUPERIOR" FOUNDATION—(Made from WESTERN beeswax exclusively. It is unequalled for tensile strength, color, texture and uniformity).

"SUPERIOR" HOFFMAN FRAMES—(For the beekeeper who wants an extra good frame at a very moderate price. Let us prove it!)

"SUPERIOR" BEE HIVES AND SUPERS—(Accurately and neatly made from WESTERN white pine—strictly clear. Our price is less).

"SUPERIOR" COMB-HONEY SHIPPING CASES—(A first-class case—glass front or plain—at an extra low price).

"SUPERIOR" EXTRACTED HONEY SHIPPING CASES—(Yes, we make them—in all sizes).

"SUPERIOR" BEE GLOVES WITH LEATHER PALMS—(Protection and wearing qualities are combined; \$1.50 per pair, postpaid).

"SUPERIOR" CYLINDRICAL BRISTLE BRUSHES—(Made of light gray bristles tightly bound in heavy wire. Bristles will not loosen; 65c each, postpaid).

"SUPERIOR" METAL EYELETS FOR FRAMES—(Insert them yourself. They stay "put." Per 1,000 75c. Tool for inserting, 25c postpaid).

"SUPERIOR" WIRE AND CLOTH VEILS—(A real veil. Used exclusively in our own apiaries for several years; \$1.55 postpaid).

"LEWIS-MARKLE" AND "ROOT" EXTRACTORS

"AMERICAN" HONEY CANS AND PAILS

"LEWIS" COMB HONEY SECTIONS

"BINGHAM" AND "ROOT" SMOKERS

SUPERIOR HONEY COMPANY, Ogden, Utah

MANUFACTURERS OF BEEKEEPERS' SUPPLIES.

Branches at Idaho Falls, Idaho, and Riverside, Calif.



Nordan's Three Banded Italian Queens (Three Banded Only)



Mr. Beekeeper: Ten years ago I would gladly have given one thousand dollars for one queen immune to Bee Paralysis. Today I am offering you queens and bees that are guaranteed to be immune to Bee Paralysis.

Prices on Bees and Queens:

Select untested queens, each	\$1.00	1-lb. pkg. bees with select untested queen	\$2.50
Select tested queens, each	\$1.50	2-lb. pkg. bees with select untested queen	\$4.00

Try them and be convinced that there is such a thing as a strain of bees immune to Bee Paralysis. They have been bred strictly for honey as well as all other points.

I guarantee safe arrival to all points in the United States and Canada.

M. S. NORDAN, MATHEWS, ALA.

Three Banded Italian Bees and Queens by Return Mail and Express

Mr. Beekeeper: I am prepared to take care of your rush orders. I have the stock, equipment and experience necessary to produce queens and bees. My queens are reared by men who know how. Each and every queen or package positively guaranteed to reach you in perfect condition and to give perfect satisfaction. You are the judge and jury. A trial order will convince you. Orders shipped when specified or money cheerfully refunded. I want every beekeeper on the continent to give my strain of bees a trial. I have fixed the price right, so you can. You cannot lose a penny, because I stand behind every bee I ship. Service and satisfaction a specialty.

PRICES—QUEENS:

	1	6	12	100
Untested	\$.90	\$ 5.25	\$ 9.50	\$ 70.00
Select untested	1.00	5.75	10.50	75.00
Tested	2.00	10.00	20.00	150.00

Pound Packages with Select Untested Queens by Express

2-lb. packages, 1 to 12, \$4.00 each; 12 or more, \$3.90 each. 3-lb. packages, 1 to 12, \$5.00 each; 12 or more, \$4.90 each.

THE FARMER APIARIES, Ramer, Alabama

A SUPERIOR QUALITY
AT LESS COST

SUPPLIES

A SUPERIOR QUALITY
AT LESS COST

(MADE BY THE DIAMOND MATCH CO.)

Compare our Prices. A trial Order will Convince You of the
Superior Quality

WATCH FOR OUR SPECIALS EACH MONTH

One Story Complete Dovetailed Hives

With metal telescope cover, inner cover, reversible bottom Hoffman frames,
nails, rabbets.

Standard size, crate of five, K. D. 8-frame	\$13.30
Standard size, crate of five, K. D. 10-frame	13.90
Jumbo size, crate of five, K. D. 10-frame	14.95

FOR MONTH OF JUNE ONLY

JUNE SPECIAL		500	1000	JUNE SPECIAL
	Sections, $4\frac{1}{4} \times 4\frac{1}{4} \times 1\frac{1}{8}$ Beeway, A grade	\$6.00	\$11.50	
	Sections, $4\frac{1}{4} \times 4\frac{1}{4} \times 1\frac{1}{8}$ Beeway, B grade	5.50	10.50	

HIVE BODIES AND EXTRACTING SUPERS

Including frames, nails, rabbets.

Standard size, crate of five, K. D. 8-frame	\$5.45
Standard size, crate of five, K. D. 10-frame	6.15
Jumbo size, crate of five, K. D. 10-frame	7.20
Shallow, crate of five, K. D. 8-frame	4.10
Shallow, crate of five, K. D. 10-frame	4.45

COMB HONEY SUPERS

No. 1 Style.

For $4\frac{1}{4} \times 4\frac{1}{4} \times 1\frac{1}{8}$ beeway sections, including section holders, separators,
springs, tins and nails.

Crate of five, K. D. 8-frame	\$3.95
Crate of five, K. D. 10-frame	4.30

HOFFMAN FRAMES

Standard size (corner cut top bar)	100, \$5.45	500, \$26.25
Shallow (corner cut top bar)	100, 5.25	500, 25.20
Jumbo (corner cut top bar)	100, 6.10	500, 29.40

DIAMOND BRAND FOUNDATION

SPECIAL

Medium, 5 lbs., 65c lb.; 50 lbs. 60c lb. Thin super, 5 lbs. 70c
lb.; 50 lbs, 65c lb.

PRICES

SPECIAL

PRICES

HOFFMAN & HAUCK, Inc., Woodhaven, N. Y.

PACKAGE BEES FOR 1923

THREE-BAND ITALIANS ONLY. BRED FOR BUSINESS

A 2-pound package of the Yancey Hustlers, with a select untested queen, for \$5.00; 25 or more, \$4.75 each. Attractive prices on large lots. One-fifth cash books your order. Safe arrival and satisfaction guaranteed on every package and queen shipped. Orders are now coming in for spring delivery. Better send in yours and make sure of shipping date. We do not accept more orders than we can fill promptly.

CANEY VALLEY APIARIES, Bay City, Texas
YANCEY BROS., OWNERS

Reduction in Prices on Three-Banded Italian Queens and Package Bees. I will pay Transportation Charges Same as Last Season.

Can now send 2-lb. packages (6 pounds gross) through to Canada via parcel post.

Prices, prepaid to buyer's address, either via express or parcel post. Effective, also, with orders already booked:

1-lb. package, including young queen	\$3.25
2-lb. package, including young queen	5.25
10 or more packages, either size, 25c per package less.	
1 select (one grade) untested queen	1.00
10 or more untested queens, each	.90
Tested queens, each	2.00

Should you find a queenless colony, send to me for young queen to save them. I will not disappoint you.

Safe arrival of bees and queen, pure mating, and a perfect queen guaranteed. Furthermore, I will make good my guarantee. Ten per cent cash required to book order, balance just before shipping. I have the bees, men and equipment to ship on the day you name. No dis-ease.

JASPER KNIGHT, Hayneville, Ala.

HONEY CONTAINERS

2½ lb. cans, per carton of 100	\$4.25
5 lb. pails, per carton of 50	3.50
10 lb. pails, per carton of 50	5.00

Above packed in cartons which are dust proof, light and easy to handle, keeping your pails and cans clean until you are ready to use them.

2½ lb. cans, per case of 24	\$1.25
5 lb. pails, per case of 12	1.10
10 lb. pails, per case of 6	.90

Above packed in wooden reshipping cases.

5 gal. cans, 1 per case	\$.90
5 gal. cans, 2 per case	1.25

Glass Jars.

8 oz. Honey Capacity, per case of 24	\$1.25
16 oz. Honey Capacity, per crate of 24	1.50
32 oz. Honey Capacity, per case of 12	1.30

Above Prices F. O. B. Reedsville.

Write for prices on large quantities of Pails and Glass Jars, stating number and sizes wanted.

A. H. Rusch & Son Co., Reedsville, Wis.

SELLING HONEY

By Frank Van Haltern.

I have been peddling honey and I have learned a few things. The most important question, and most frequently asked, is this: "Is your honey pure?" Time after time and day after day, I am asked that same question and to all I say "It is from my own bees. But you have only my word for that—you will have to judge for yourself." I let them taste the honey, I guarantee it in every way and give them the privilege of returning the honey any time and for any reason.

So far I have had not a single order returned or a single kick on the quality of the honey. I know that people buy because they want the honey if it is pure. The average person wants to keep what he has bought as long as he knows he can return it any time. When the privilege of returning is taken away he is more likely to complain of his purchase.

Persons have asserted to me that they had worked at places where honey was manufactured and they knew. Some won't buy comb honey because they fear it is factory made. The greatest prejudice, however, is against extracted honey. The fact that usually only the finest grades are sold in the comb while the poorer grades go through the extractor is partly responsible for the belief that extracted honey contains sugar, glucose or molasses. Then there are the many different kinds of honey. A consumer used to one kind thinks the others are adulterated.

The point on which the housewife displays the greatest ignorance is how to use honey. I find that 95 per cent of my customers buy honey to use on biscuits and pancakes, or probably to make a few cough remedies. When I mention cooking with honey to the housewife she confesses total ignorance.

It seems to me that this is our greatest opportunity. The quantity of honey used on hot cakes is very small compared to what would be used if every housewife knew how to make delicious cakes, cookies and candies with honey. Who can doubt that recipes on every box of raisins have been at least partly responsible for the almost universal use of raisins? Without the soap recipes on cans of lye the manufacturers would lose many sales. Everybody is doing it. Why not the beekeeper, also?

Look in any store that handles honey and how many recipes do you see on pails of honey? They are noticeable for their almost total absence—at least in Kansas. Honey has too long been a luxury to admire and taste occasionally. With increasing production honey must find its place in every home in the form of honey breads, cakes, cookies, candies, desserts, and in canning and preserving. Then, and then only, will extracted honey come into its proper place and comb honey will be only a fancy side line.

A Crop Shortage in California

The orange bloom in California is now entirely over, and the crop from this important source of nectar is practically a failure, as there will not be 20 per cent of a normal crop. At no time during the orange bloom has much headway been made toward a surplus, due largely to cool, cloudy and windy weather. At frequent intervals the colonies, as confirmed by the readings of actual scale hives, have lost in weight, both in stores and in field bees. It would seem that or-

ange blossom honey will be almost an unknown quantity on the markets of the U. S. during this next annual period, as there is not sufficient for local California trade.

So far as the sage outlook is concerned, there is no encouragement of a crop to date from the sage. The black or button sage will not yield at all, its period of yielding being past, and chances are heavily against a yield from the white sage, which is showing some growth in certain localities, but not thrifty enough to count on any surplus honey. It is the consensus of opinion among local beekeepers that if their colonies secure sufficient nectar for winter stores they will indeed be very fortunate.

Relative to prices to be expected for honey, after careful consideration at a joint meeting, the representatives of the several beekeeping organizations of the southern California counties have recommended to their members a price of 12c per pound in carload lots for white honey from orange or sage bloom, where any such honey may be available during the season, and a price of 10c for light amber grades. In less than car-

load lots an additional 2c or more per pound is asked. Even if crop prospects should improve, this slight advance will not cover the actual cost of production this year. It is quite generally agreed among those beekeepers who have watched their production costs from year to year, that it costs approximately 10c per pound to produce a normal crop of honey during favorable seasons. Furthermore, an additional reason for the strengthening of honey prices is the rapid rise in the market price of sugar, and amber grades of honey should advance in sympathy. If pure honey were not to command as high a price as sugar there would indeed be something radically wrong. White grades of alfalfa and clover honey should easily command a wholesale price of 10c per pound at the present time, net, to the beekeeper, and I predict an early strengthening in prices throughout the Inter-mountain and other clover districts.

F. W. Redfield.

1903—1923

Darrow's Queens Excel

I am offering Darrow's select Italian queens at the following prices:

1 to 3, inclusive ----- \$1.25 each
4 to 9, inclusive ----- 1.15 each
10 or more ----- 1.00 each

Perfect mates, Prompt shipment. Orders acknowledged. Be satisfied. Order from

WILLIE H. DARROW

Rt. 1, Milo, Mo.

SAFE ARRIVAL

NO DISEASE

THE STAPLETON APIARIES

Three-banded bees and queens. Not the cheapest, but the best. Read what others say:

"Your bees arrived in fine shape, only about a dozen dead bees. Also your bees make the trip in less time than the majority of other shippers. They build up quickly, beating nuclei bought from other Southern shippers."—Canada.

"You fulfilled your contract with a generosity that was beyond the letter of the contract. In no instance was there any question by you in regard to a loss claimed by a buyer. Replacements were made with great promptness. Our losses were unusually few, due, I believe, to care in making shipments. It was, indeed, a pleasure to do business with you."—Detroit.

Untested Queens ----- \$1.00 each. Tested Queens ----- \$1.50 each
One pound package bees with untested queen, \$3.00; two-lb. package bees with untested queen, \$4.00; three-lb. package bees with untested queen, \$5.00. Ten per cent discount on order of \$25.00 or more.

Large stock from which to select. Shipments leave Colquitt at 5:30 o'clock P. M., arriving in northern points usually in three days. Satisfaction guaranteed.

N. L. STAPLETON, Colquitt, Ga.

Illinois Organizations

Illinois now has 20 beekeepers' associations affiliated with the state organization. The affiliation of local associations with the state society makes it possible for beekeepers to use their combined influence for anything necessary for the good of the industry. Some states have more locals than has Illinois, which has been rather backward in the matter of organization.

TOO LATE TO CLASSIFY

MERRILL'S QUEENS—\$1.00 each.
R. E. Merrill, Muncy, Pa.

WANTED—By beginner, 18, summer work with beekeeper in Missouri or Illinois. References. Melvin Keil, 4460-a Lexington Ave., St. Louis, Mo.

THAGARD'S 3-banded Queens, "Bred for Quality," have stood the test in the past. They are bred from breeders direct from Italy; 1 to 5, \$1; 6 to 11, 90c; 12 up, 75c. The V. R. Thagard Co., Greenville, Ala.

WE HAVE SECURED Tortora's Cleopatra from W. A. Holmberg, Denair, Calif. This queen was imported from Italy last summer by Mr. Holmberg from Tortora, of Ozzana, Italy. Owing to the bright color of the queens this is the most popular strain of bees in Italy. Untested, 1 o 11, \$1.50; 12 and up, \$1.40. The V. R. Thagard Co., Greenville, Ala.

NOTICE TO BEEKEEPERS

I am now prepared to furnish queens by return mail.

Single \$1; six, \$5.50; twelve, \$10. Lots of 50 or more, 60c each

Now is your chance to gather a good honey crop next season by requeening at these low prices. My stock is of the best Italian strain

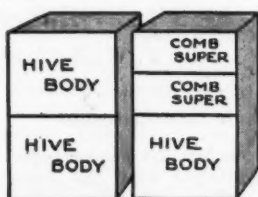
A. B. MARCHANT, Jesup, Ga.

 49 YEARS FOR PROGRESS IN BEEKEEPING — No. 6

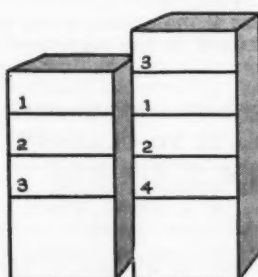
SUPERS SAVE Your Honey Flow

More honey is lost by beekeepers for lack of "Super" room on the hives during the honey flow than for any other one cause.

HOW TO "SUPER" FOR COMB HONEY PRODUCTION



AT HONEY FLOW, one of the two hive bodies should be displaced by the section supers.



Note the arrangement of additional supers. If honey flow is slowing up, super No. 4 should be placed on top instead of as shown. Remove supers as completely filled; at close of flow, replace second hive body filled with capped honey for winter.

All the standard kinds of supers for comb and extracted honey which carry the Lewis Beeware mark of quality are made after practical designs worked out and proved out by the largest honey producers in the country.

This is the conclusion we have reached through many years of beekeeping experience—with scores of leading commercial beekeepers agreeing.

Referring to his best honey season, Dr. C. C. Miller once said: "There was no stinting of surplus room. As fast as needed, an empty super was added below. During the height of the harvest there were on the hive *an average of five supers each*. A few colonies had as many as seven or eight supers each at one time.

Supers are as necessary to the honey harvest as crates to the berry or orange or apple crop. Cutting your beekeeping cost—making a profit—saving the honey crop—all depend largely on proper supering of your hives.

Since last July, our factory has run full time to provide supers for your 1923 crop. Our four branches and hundreds of Beeware dealers are on their toes to meet the rush of mid-season orders.

Don't wait till stocks are exhausted! Cover your requirements now—provide sufficient supers to care for the capacity of your swarms. And "beware" that your hives, supers and supplies bear the Lewis Beeware stamp of quality and accuracy.



LEWIS BEEWARE

G. B. LEWIS COMPANY

Home Office and Works—Watertown, Wisconsin, U. S. A.

BRANCHES — ALBANY, N. Y. LYNCHBURG, VA. MEMPHIS, TENN. WICHITA, KAN.
OVER 300 DEALERS THROUGHOUT NORTH AMERICA



VOL. LXIII—NO. 6

HAMILTON, ILL., JUNE, 1923

MONTHLY, \$1.50 A YEAR

HONEY REGIONS OF COLORADO ✓

Notes on Soil and Climatic Conditions and the Sources of Nectar in the Centennial State

By Newton Boggs

COLORADO lies in the central part of the Rocky Mountain region and contains some of the most elevated portions of the Rocky Mountains in the United States. This state has the highest mean altitude of any state, only about one-fourth of its area being below 5,000 feet, while approximately two-thirds of it ranges from 6,000 to 14,000 feet. It has more than forty peaks that tower 14,000 feet or higher above sea level, and approximately 325 peaks having an altitude of more than 10,000 feet. The eastern two-fifths of the state lies in the Great Plains and is either a level or a broken prairie crossed by the valleys of the Arkansas and South Platte Rivers and their numerous tributaries, which rise gradually from the state line westward to the foothills of the Rockies. The main range of the Rocky Mountains passes north and south through the central part of the state, with numerous secondary ranges and spurs running in all directions, giving Colorado the greatest extent and widest variety of mountain scenery found in any state. The western part lies in the Pacific watershed, and contains the largest streams in the state. Its surface is much more broken than that of the eastern part of the state, embracing numerous high mesas and fertile narrow agricultural valleys, from which rise the rugged and picturesque San Juan Mountains in the southwest. In outline the state is almost a perfect rectangle. It ranks seventh in size, being more than twelve times as large as the state of Massachusetts, and nearly twice as large as Iowa.

Beekeeping Regions

Very few bees are kept in the non-

irrigated sections of the state. The industry is confined to the alfalfa-producing districts. Therefore, we can divide the beekeeping part of Colorado into six regions:

First, the northern region, or that part irrigated by the South Platte



Interior of the Drexel honey house.

River or its tributaries. This section is well filled with beekeepers, excepting parts of Logan and Sedgwick counties. However, the County

Agent of Logan County says "In another year, Logan County will have twice as many colonies of bees."

Second, the Arkansas Valley, extending through the southern part of the eastern half of the state. A few of Colorado's most extensive beekeepers are located in this valley.

Third, the San Luis Valley, with an elevation of 7,500 feet, a vast basin, the bed of an ancient lake, lying in the south central part of the state, almost wholly surrounded by mountain ranges. There probably are numerous localities here that would yield good returns from honey, as a considerable amount of alfalfa is raised for seed and sweet clover covers the waste places and seep land. This section awaits the progressive beekeeper.

Fourth, the San Juan Basin is a region from moderate to heavy rainfall, having a considerable area of irrigated land in the river valleys, where alfalfa and sweet clover furnish abundant pasture for bees. Some high averages of honey production have been made in this region. The only drawback is the rail transportation and very high freight rates, costing about \$300 to ship a car of honey from Dolores to Denver.

Fifth, the valleys of the Colorado, Gunnison, Uncompaghe and other rivers of the Colorado watershed, contain the principal fruit growing areas of the state, as well as a large amount of good beekeeping territory. In some of these valleys we find the farmers cutting three crops of alfalfa, while within a half to a mile away on the mesas we find only two cuttings of alfalfa. This makes a continuous flow of nectar available nearly the entire season, as the crops



Very few bees are kept in non-irrigated districts of Colorado. The shaded areas show where most of the honey is produced.

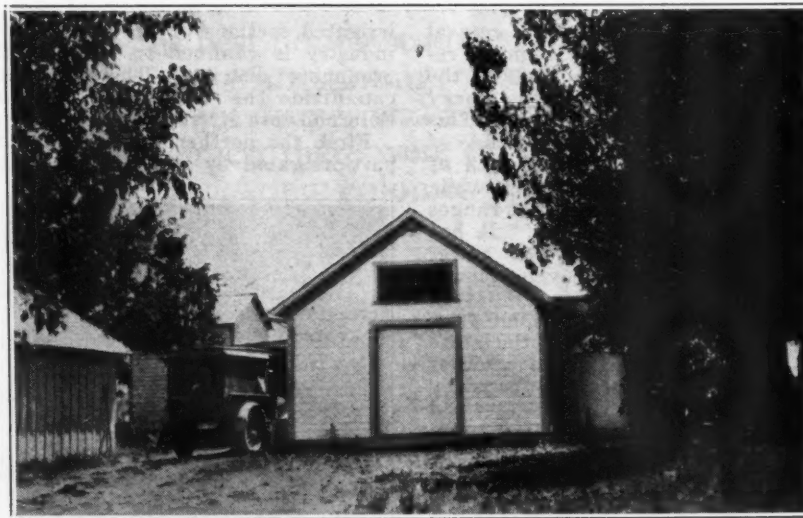
on the mesas fill in between flows in the valleys. This region produces between 35 and 50 cars of honey annually.

Sixth, the northwestern section of the state contains few bees, as it is undeveloped as yet on account of inadequate transportation.

Climatological data, according to Colorado Year Book, 1922: As a result of the great size and the extreme irregularity of its surface, the climate of Colorado is wonderfully varied. The mean annual temperature for the entire state is 44.6 degrees, but it varies from about 31 degrees in some of the higher mountain districts to 52 degrees in parts of the Arkansas Valley. The average annual precipitation for the state is 17.54, but there is also a very wide range here in the different sections of the state. The lowest average precipitation is about 6.5 inches in the San Luis Valley, and the highest above 30 inches, in the San Juan Mountains. The delightful and wonderfully healthful qualities of Colorado's climate are well known throughout the country. The rainfall is comparatively light in all sections of the state and the percentage of sunshine is very high. The amount of moisture in the air is always low and as a result the unpleasant effects of extremely low or high temperature are greatly modified. The relative annual humidity averages from 45 to 60 per cent being lower than in any other state except Arizona. The high altitude is another important factor in governing climatic conditions in the state. As a result of this high altitude and the correspondingly low atmospheric pressure, impurities in the air are quickly dissipated and the depressing effects common at low altitudes during periods of damp weather, are entirely foreign to this state.

The total number of stands of bees in the state is well above the 100,000 mark. During 1919, more than 60

cars of honey was shipped out of the state in straight carlots and a large amount was shipped in less than carload lots.



Beekeeping as an exclusive business is not unusual in Colorado. This shows the honey house of Frank H. Drexel, Crawford, Colo.

Honey Plants of Colorado

Sweet clover is found throughout the state and is a valuable honey plant in that it yields as well as alfalfa. Being mostly in waste places, it is not used as hay, thereby helping considerably between alfalfa flows. Practically all surplus is secured from these two plants, with an occasional crop from cleome. The rosin weed (*Grindelia squarrosa*) yields considerable honey of low grade, which often spoils the grade of the white honey by being mixed in the super. Parsley, prairie clover and Narcissus are prairie plants which bees work on freely. Soft maple, dandelion and fruit bloom are important for spring brood rearing. In the mountains are found several early blooming plants which are excellent for building up in

spring. In the Arkansas Valley cantaloupes yield some surplus. Oreocarya is a desert plant which yields surplus. Wild currant is found in the mountain canyons. Loco weeds are found in the foothills and yield some honey during May and June. Sunflowers add something to the sum total brought in by the bees.

INTRODUCING QUEENS BY THE HONEY METHOD

In the May issue of the American Bee Journal, page 244, I read an article from Mr. Baldwin, of Georgia about introducing queens by the honey method.

After trying several methods at our experimental apiary near Seguin, Guadalupe County, Texas, of introducing queens received by mail, the following method has been used successfully without a single failure:

Take some honey from the colony that you intend to requeen and put through the screen wire on the new queen and her attendants. Do not use too much honey, as it may injure the queen and cause a failure. Then loosen the nails of the wire screen of the mailing cage so the queen can crawl out easily, whenever you want her to. Then remove the queen from

the colony to be requeened and with as little delay as possible let the new queen crawl with the bees on the comb on which you found the old queen. The new queen has to be liberated before the colony ever misses the old queen.

If you have to go in the apiary house after removing the old queen in order to get the new queen ready, it will be better to introduce by the cage method.

The principle of the honey method is:

The bees do not know they have a new queen and must not find out they have ever been queenless. If they once find out they have been queenless there will be a certain percentage of failures no matter how much or how little honey has been used.

R. J. Willmann.

EFFECT ON HONEYBEES OF TREATING COTTON PLANTS WITH CALCIUM ARSENATE

By N. C. McIndoo.

Four localities, all lying south of Tallulah, were selected; 2 being used for the molasses-arsenate experiments, and the other 2 being for the dusting experiments. At the former 2 places 20 colonies of bees were located, and 12 colonies were transferred to the latter 2 places. A dead bee trap was installed in front of each of 24 of these hives of bees.

The calcium arsenate dust was applied at night time by following the regular dusting schedule. Sixty acres of cotton near the bees were dusted by the station men, and the farmers, themselves, dusted other cotton fields a short distance away.

To test the effect on bees of poisoned molasses and sugar arsenate, mixtures were applied, 4 formulas and 2 methods of application being used. The first formula consisted of 1 gallon of molasses, 1 gallon of water and 2 pounds of calcium arsenate, well mixed; 1 gallon of the mixture being applied per acre of cotton by means of mops, made of muslin sacks. Two 5-acre plats were treated with this mixture on July 8, 13, 21, 26 and August 2, black strap molasses being used. The second formula consisted of 2.5 gallons of black strap molasses, 7.5 gallons of water and 10 pounds of calcium arsenate. Fifty gallons of this mixture were applied by means of knapsack sprayers to 10 acres of cotton. The third formula consisted of 4 quarts of granulated sugar, 3 quarts of water and 2 pounds of calcium arsenate, and the fourth formula consisted of 1 gallon of granulated sugar, 3 gallons of water and 4 pounds of calcium arsenate. Five gallons of mixture made by the third formula were applied by the mops to a 5-acre plat, and 25 gallons of mixture made by the fourth formula were applied by means of the sprayers to the other 5-acre plat on August 7, 10 and 15.

This investigation showed that the bees do not collect cotton pollen, but do collect nectar from the cotton blossoms, although this nectar comes from only the inner involucre nectaries, which are fully exposed to all dusting and spraying applications. Bees collecting the nectar, rarely alight on the leaves or stems of cotton plants, but usually alight on the inner or outermost surface of the floral bracts, at the base of which lie the large inner involucre nectaries whose secretion generally stands on the surface as good-sized drops.

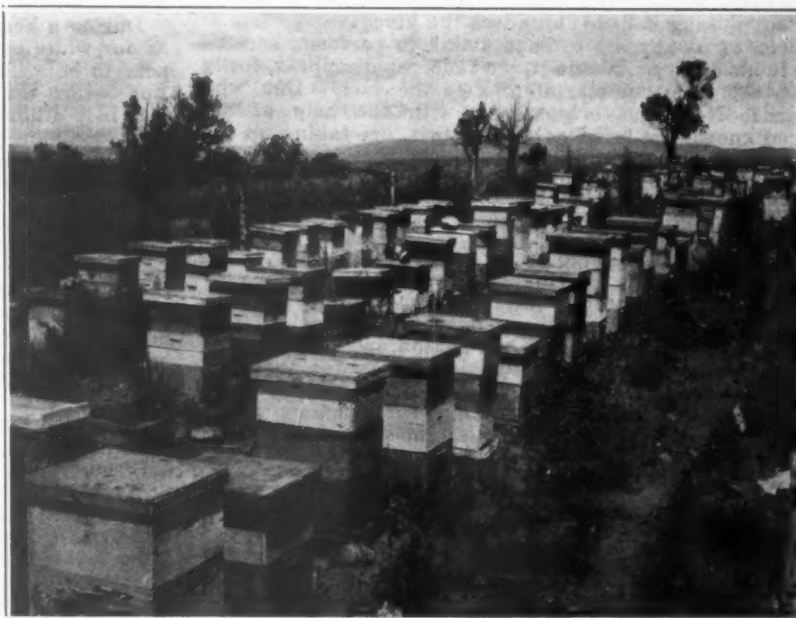
Concluding from the above description of bees collecting nectar, we would not suspect the pollen stored in the hives to be poisoned, but would suspect the green honey to contain poison; such was the case judging from the analyses of samples analyzed, although the honey contained scarcely more than a trace of ar-

senic, and certainly not enough to harm the bees eating it. We would also suspect the bees, visiting cotton treated with calcium arsenate dust or molasses and sugar arsenate mixtures, to carry more or less arsenic on the outside of their bodies, and probably a limited quantity inside their bodies, providing they swallowed some of the dust when cleaning themselves, or ate some of the sweet arsenate mixture. All of the samples of dead bees analyzed, subjected to these conditions, contained incredible quantities of metallic arsenic, or many times the amount ordinarily required to kill bees; but practically all of it in the samples which had visited the dusted cotton was carried on the outside of their bodies and not enough of it had been swallowed to have killed the bees. This statement is supported by the fact that the bees

was normal. The sample of bees, subjected to cotton mopped and sprayed with sugar-arsenate mixtures, contained three times as much arsenic as did the others just described, yet only one-tenth of it seems to have been on the outside of their bodies; the bees thus treated died abnormally for only a short time, but the general condition of the colonies was not perceptibly affected.

In conclusion, this investigation indicates that the practice of dusting cotton for the purpose of controlling this boll weevil does do perceptible damage to honeybees, but it would seem to play havoc with other insects which collect the dusted pollen, because some of them work on the pollen exclusively. The practice of using cheap grades of molasses in calcium-arsenate mixtures would seem to have but little effect on honeybees under ordinary conditions, but if the bees were forced to work exclusively upon the cotton so treated the effect might be serious.

The preceding results were obtained from only one season's experimentation and are not considered final, and they show indications for a



This apiary, belonging to Conklin & Weeks, of Delta, Colo., is typical of the comb-honey yards of that state.

subjected to the dusted cotton apparently never died abnormally. On only one occasion did 2 of the colonies of bees die abnormally when the cotton was treated with black strap molasses-arsenate mixture which had been applied by means of mops. Analyses of samples of these bees showed that one-third of the arsenic was carried on the outside of their bodies. Samples of other bees, subjected to cotton sprayed with the molasses-arsenate mixture, contained slightly more arsenate than did the above bees, but only one-tenth of it appeared to be on the outside of their bodies; the bees in these samples had died only slightly abnormally, but the average death rate for all 6 colonies

single location. If they were repeated at other places where the soil, climate and other factors were different, different results might be obtained.

Louisiana.

New County Organization

The beekeepers of Juneau County, Wis., organized a local County Beekeepers' association, March 13, 1923, to affiliate with the State Association. The following officers were elected: President, Frank Riley, Elroy, Wis.; Vice President, Louis A. Loboda, New Lisbon, Wis.; Secretary and Treasurer, Willard Franks, Mauston, Wis.

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THE EDITORS' VIEWPOINTS

ANOTHER PIONEER PASSES ON

In another column, the reader will find an account of the demise of one of the eldest and most active beekeepers of modern days, A. I. Root, known the world over.

One by one, slowly but surely, the old guard disappears; the men who saw the dawn of progressive beekeeping and who helped its growth. It would be very discouraging to see these useful spirits, each in turn, passing beyond the world's activities, were it not that new men are constantly taking their place. "Le roi est mort, vive le roi" (The king is dead; long live the king).

Each of us appears to have a task to perform, according to his ability. We do it, we fade, we disappear, lucky if we can keep our star shining to the last. But why mourn? New men, bright men, with the help of acquired knowledge left by the ancestors, are taking up the same duties and continue the work. It is progress, and we need never regret the past, as long as the new men are there.

SUMMER CARES

Don't forget that, in summer, the bees need more ventilation than in winter. The commercial beekeeper who keeps bees as a business does not need to be told of this. Yet in how many apiaries of production are not the colonies suffering for want of sufficient room for the field workers to pass in and out or for proper means of ventilation? This is an important matter; for a colony which suffers for want of ventilation is almost certain to get the swarming fever even before the hive is full of honey. Besides, we should see to it that our bees have everything made comfortable, so they may be able to force air up to the topmost story of the hive without undue effort.

Langstroth, like Huber, called our attention to the absolute need of air in the hive, just as in our home. Let us quote:

"It is said that ventilation cannot, in our case be had without cost. Can it then be had for nothing by the industrious bee? Those ranks of bees, so indefatigably plying their busy wings, are not engaged in idle amusement; nor might they, as some shallow utilitarian may imagine, be better employed in gathering honey, or superintending some other department in the economy of the hive. At great expense of time and labor, they are supplying the rest of the colony with the pure air so conducive to their health and prosperity."

Bees never need to hang out in clusters on the outside of the hive, except in those days of drouth when nothing may be found in the fields. At all times when honey is to be had, if they hang out, they are evidently in need of ventilation, shade, or room, or perhaps of all those requirements. Look after them.

DON'T TAKE THE INCREASE FROM YOUR BEST COLONIES

If you are managing your bees right, you will have but few natural swarms. But you may be wanting to increase the number of your colonies. In that case, do not make

the increase from the best colonies, for those are the ones that will give you the biggest honey crop.

In every apiary there are colonies of the very best quality, which are ready for the harvest at the proper time; there are also some colonies which, for some reason or other, have not raised their largest force in time. These are the ones from which you must take the increase, for the bulk of their force will be too late for the heavy harvest.

As a matter of course, if we rear our own queens, they must be produced, as well as our drones, from some of our very best colonies, but the swarm itself must be taken from those belated ones that cannot be expected to harvest much.

Do not understand me as saying that you must make divisions from weak colonies. But you must learn to discern which are the colonies that are ready for the harvest in time and also which are the ones that, although breeding heavily, will come too late for a big crop. If you select the latter for increase, you may produce both a heavy harvest of honey and a fairly large increase.

The honey crop, usually, lasts but a few days, a few weeks at most, and you must take advantage of all the opportunities that enable us to succeed.

OVERSTOCKING A LOCATION

How many colonies can I keep in one place, and how far apart should I locate my apiaries?

That is a question which it is very important to answer properly, and yet there are great difficulties in properly answering it. Alexander kept as many as 700 colonies in one apiary. I never had bees in a location where more than 120 colonies would prosper.

During a heavy harvest, when the bloom is as plentiful as our white clover often is in Illinois, there does not appear to be a likelihood of the locality being overstocked. But before the big crop, and after it, the blossoms that may help a hundred colonies along would not be sufficient for three hundred.

Then there is the question of distance. How far can bees travel profitably for honey? Doolittle said seven miles. But he must have been in a special location. I have seen bees actually starve three miles away from a section of plentiful harvest. They were unable to find it. In countries of vast plains, or in valleys where the pasturage may be reached without traveling over hills and woods, the bees are able to harvest honey three miles or more away. But in the average localities with woods, hills, extensive tilled lands between them and the crop, we would make a mistake if we expected them to go over two miles in any direction. Therefore I have at all times found it safe to place apiaries four miles apart without fear of their interfering with one another in the harvest.

We have our old friend, Mr. L. C. Root, son-in-law of Moses Quinby, as an authority on the difference in crops between an apiary located among the flowers and another located as far as seven miles from the crop. Mr. Root had 100 colonies about seven miles from a heavy basswood harvest. The bees found it, but he thought best to bring about a third of the colonies up to this timber. The result was that these bees harvested about three times as much honey as those which had to travel the seven miles. Forty colonies, in 7 days, secured 4,103 pounds of basswood honey. So, although Mr. Root is positive that bees will go 7 miles for honey in an emergency, he believes in locating them as near the crop as possible. (See American Bee Journal, March, 1917, page 86).

PROTECTION

"L'Abeille & Sa Culture," of Belgium, writes in its April number:

"The struggle for life is getting rougher, disguising less and less the selfish motives that regulate the actions of men. We find another proof of it in the last number of L'Apiculteur which, under the title of 'Gingerbread and Duties,' demands an increase of custom duties upon foreign gingerbread, especially that of Belgium.

"In conclusion of the article, the writer hopes that the Belgian friends will not resent so just a demand, and will kindly accept this proposal of custom increase."

"He is evidently trying to put flowers around the rope

intended to hang us. Is the proposal fair? We have not had time to investigate this matter; but in how many points is not the custom regulation unfavorable to our small country? And yet, are we not worthy of some consideration? When Belgium was 'committing suicide' heroically, for mankind and France, there was no end to the kind words; the finest speeches and the most beautiful written comments were lavished on us.

"By our race, by our language, by our affinities, we are considered as friends. But self-interest causes everything else to be forgotten."

Yes that is the trouble with all customs revenues. Nothing but keen, cold, selfish interest is considered in the commercial relations between countries. The very best friends are but commercial enemies. Gingerbread is made with honey and hence the feeling among beekeepers.

LESS WAX IN OLD COMBS

I see in one of our exchanges the repetition of an error which appears very common; it is that "old combs contain very little wax."

It would be more correct to say that old combs contain so much foreign matter, cocoons, excrements of the drones, cast skins of the larvae, that the wax gets soaked with these when rendered and the result is unsatisfactory. That is why we always want to soak the old combs before rendering them, after having crushed them. When these residues are soaked with water, they do not absorb any wax and the wax rises to the top of the kettle. But it is a fact that old combs contain at least as much wax as new ones.

RENTING BEES TO POLLENIZE BLOSSOMS

Renting bees to orchardists appears to be a regular occurrence in California, as the "Western Honey Bee" mentions a number of instances where bees have been rented for the pollenizing of bloom at from \$1.50 to \$2.50 per colony. See April, 1923, number, page 113.

The usefulness of honeybees in flower fertilization is apparently well recognized at present.

A CHANGE IN HIVES

Mr. E. M. Cole has a contribution in this issue under the above name. Mr. Cole makes a very ingenious comparison of divided brood chambers with divided fields. He calls attention to the fact that a brood chamber in two stories requires a greater number of bees to keep the brood warm than in a single large story, because the bees also have to keep up the warmth of the top and bottom bars and bee space between the stories, besides often a strip of honey at the top of the lower story. So he compares the two small stories to two 40-acre fields separated, for which as much fence is needed as would enclose 160 acres in one piece.

Every now and then a very forcible argument is made, which brings facts to the mind in most acceptable form. This one is certainly a most felicitous comparison.

SWARM CONTROL

In this number, our readers will find an excellent article on swarm control by Prof. Park.

The beginner and the active producer must not forget that we have often urged, above all things, to follow the principal elementary requirements for the possible prevention of swarming, to-wit:

Young queens, prolific and not likely to be superseded at swarming time.

Control of drone-rearing. A colony overstocked with drones and otherwise thrifty will swarm most readily, the drones causing more intensive heat within the hive. This would be more positive if Dr. Brunnich's statements upon the body heat of the drones are correct.

Shade. Colonies exposed to the heat of an afternoon sun, in June and July, are bound to be more or less ill at ease.

Ventilation. A large opening at the hive bottom, large enough so the bees will not need to cluster on the outside. The spacing of combs one-and-a-half inches from center to center helps reduce swarming.

If all these points are observed, in addition to those mentioned in the contribution which we publish in this number, swarming will be much reduced. But please bear in mind that there is no such thing as entire control of swarming in prosperous apiaries.

HONEY IN GLASS

The Kansas City Grocer, in a recent issue, gave some attention to honey as a desirable article of food. The statement was advanced, however, that a great mistake is made in featuring honey in small glass containers. "Honey should be sold in a container large enough to give the consumer a chance to get a good taste and like it, and the chances are he'll use it for some time to come," says the Grocer.

A publication published for the benefit of the grocery trade is unbiased in a matter of this kind and the suggestion made is a very good one. When honey is sold in small containers the cost of package brings the price per pound too high to be sold economically. If the beekeepers would abandon the small glass containers and push the sale of honey in larger tin packages the total amount of honey sold would be materially increased.

HAND SPACING OF COMBS

Some beekeepers think it is a very great tax on the operator to be compelled to space combs by hand; for that reason they do not wish to dispense with the shoulders on the Hoffman frames. Yet those shoulders are very much in the way for uncapping and extracting.

It is not a very difficult matter for a beekeeper to learn how to space combs with the fingers, and do it in a hurry. It takes practice. The trouble is that we do not take the time to learn a thing thoroughly before passing upon its practicability. The writer can tolerate spacing shoulders on brood frames, but not by any means upon extracting frames. They are an unmitigated nuisance.

SIGHT OF BEES

We read all sorts of statements concerning the sight or lack of sight of bees; some people even intimating that bees can hardly see at all, others holding that they can see even the least little speck. Some go as far as to say that they can see a field of blossoms two miles away.

Well, bees do see. When a bee is angry, it can find you readily and goes for your eyes above all other spots. When you open a hive, if it is done carefully, bees will fly from the combs right out to the field through the space between the combs, and I have often wondered whether they were not astonished to find the roof of their brood chamber thus suddenly removed.

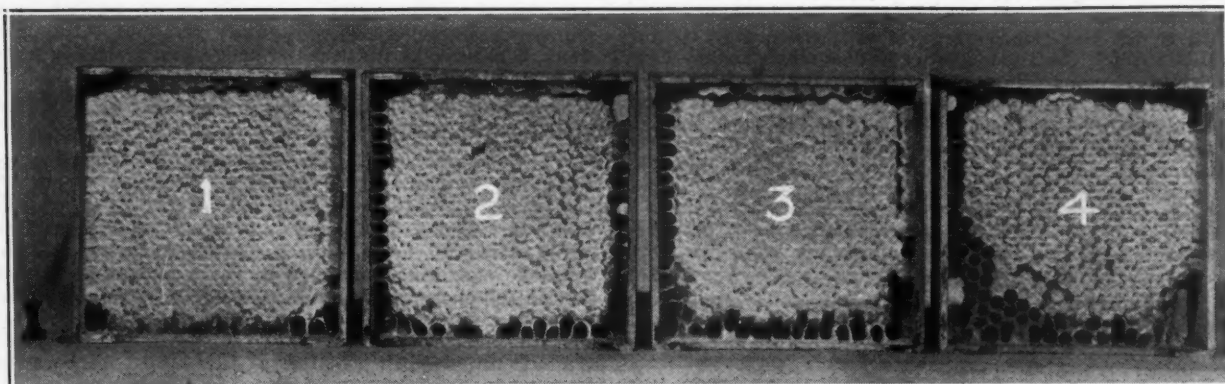
The queen can readily see daylight and when you open the hive she will flee to the dark corners, trying to hide among the workers.

The bees take so good a note of the things surrounding the hive that they will miss its location even when it has been moved only a few inches. Yet, in a perfectly bare spot, where there are no reference points, they will come to the hive even if it has been moved a foot or two.

Evidently, the sight of bees differs from ours. They have more eyes, thousands of them, but those eyes are immovable in their head and probably give them a different "point of view" from our own eyes. But bees do see, very clearly, what they are interested in seeing.

A NOTABLE BOOK ON QUEEN REARING

This is a French work, by a practical man, A. Perret-Maisonnette, entitled "Apiculture Intensive & Elevage des Reines" ("Intensive Beekeeping and Queen Rearing"). It is the most thorough work ever printed on this question, for it details every method known. The author has evidently read all modern works on queen rearing, for he quotes 93 writers, of which some 30 are American. He makes copious quotations from such writers as Alley, Alexander, Benton, Cook, the Dadants, Davis, Demuth, Doolittle, Hutchinson, Langstroth, C. C. Miller, Pellett, Dr. Phillips, Pratt, Quinby, Rauchfuss, Root, and Dr. White. We will give a more detailed bibliography concerning it in a future number. The work contains 450 pages and a number of cuts.



The Colorado rules recognize four grades of comb honey, as shown in this illustration.

GRADING COMB HONEY

By Frank Rauchfuss, Manager Colorado Honey Producers' Association

WE grade honey for the purpose of bringing our product before the ultimate distributor in such shape that it may be sold without any further manipulation at the best possible price. To accomplish this we must see that the contents of each particular case are as nearly uniform in finish, color and weight as can be. The nearer we come to this, the better price the distributor can pay us. The variation in the selling price of the best and poorest case permissible in any one grade should be as little as possible. Otherwise we only get a fair price for the poorer and a poor price for the better cases of that grade. Much on the same basis the shipper of a car of mixed apples will get at best a fair value for the poor stock in the car.

Grading rules should be explicit and as much as possible couched in language that will not permit of any misinterpretation on either side, buyer or seller.

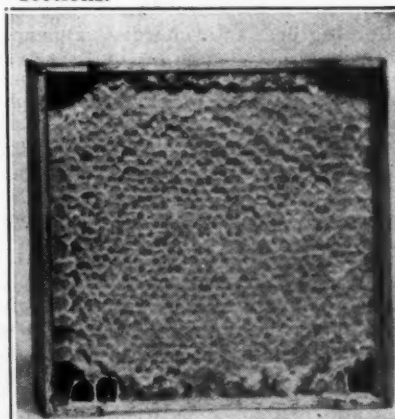
In selecting grading samples we

feel that the limit of color and finish for the grade should be the determining factor, and not how good a section should go into a grade. If we tell the party grading what is the poorest section that he or she may put into a grade, they are more apt to do a good job of grading than if we just simply put the best sections of that grade before them. The pictures shown in connection with this article are designed to assist the beekeeper in grading his honey properly. However, it is very difficult to show color values properly by means of a picture. Again the picture shows only one side of the section, while both sides must be considered and the poorer side usually determines the grade in which the section belongs.

Things Not Permitted

To begin with, the beekeeper should become familiar with the things which are not permitted. The following list indicates which sections should not be shipped but should be sold as off grade or cull:

1. Honey packed in second-hand cases.
2. Honey in badly stained or mildewed sections.
3. Honey showing signs of granulation.
4. Leaking, injured or patched-up sections.



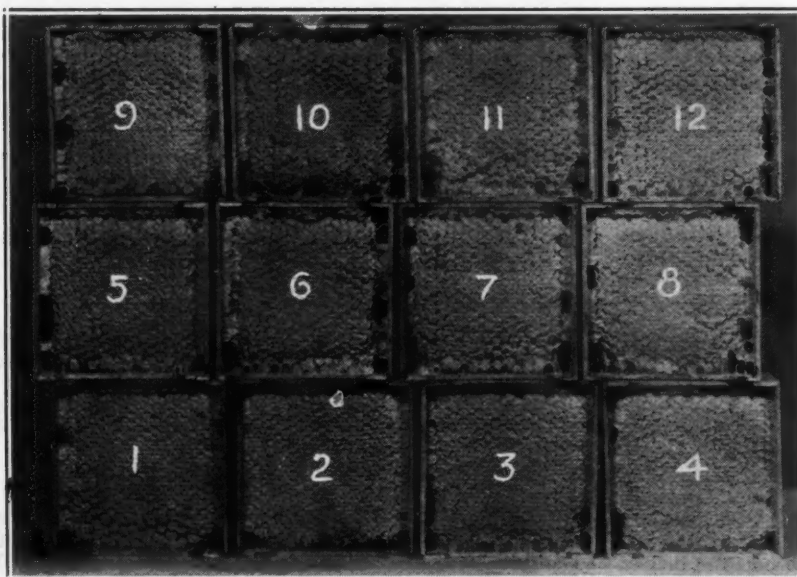
A typical section of extra fancy comb honey.

5. Sections with more than 50 uncapped cells.
6. Sections containing honeydew.
7. Sections below the minimum weight.

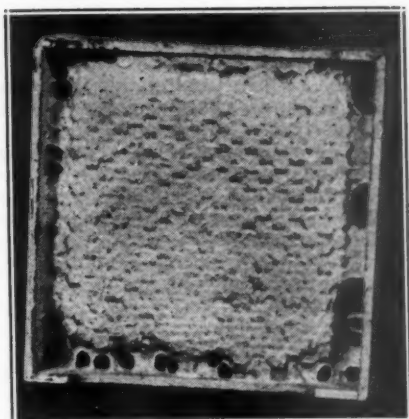
The Grades

At the top of this page are shown the 4 grades recognized by the Colorado rules, extra fancy, fancy, choice and off grade. The section shown is off grade because of too many empty cells, although it is otherwise good.

Fig. 2 shows a typical section of extra fancy honey. Of this particular grade we never have a very large stock on hand for the reason that most of our commercial comb honey producers feel that it is not worth their while to separate the small percentage of extra fancy honey that is obtained if the grading rules are strictly applied, and they feel that by leaving this extra fancy honey in and putting it with the fancy stock they will enhance the value and appearance of their fancy grade sufficiently to make it worth their while. However, a limited quantity of extra fancy is being packed by producers



Twelve sections of extra fancy comb honey, showing the range of finish permitted in that grade.



A typical section of fancy comb honey.

that are in exceptionally favorable locations, or who have an exceptionally good crop, and this is generally used to satisfy the local demand of exacting customers that are willing to pay a fancy price for such stock. It is generally put up in Bearbrand cartons by us for this trade, and some of it is used for exhibition purposes.

The Colorado rules require that to grade extra fancy the sections must be well filled, comb firmly attached on all sides and evenly capped, except the outside row next to the wood. Honey, combs and cappings white and not projecting beyond wood. The wood to be well cleaned; no section in this grade to weigh less than 13½ ounces, gross, or 12½ ounces net.

Fig. 3 shows twelve sections of extra fancy comb honey. By referring to the picture it will be seen that the sections come within the rules as follows:

1.
Net weight—15¼ ounces.
Finish—Very good and even.
Attachment to wood—Very good.
Color of cappings—Fairly white.
Color of honey—White.
2.
Net weight—16 ounces.
Finish—Very good and even.
Attachment to wood—Very good.
Color of cappings—White.
Color of honey—White.
3.
Net weight—15¼ ounces.
Finish—Very good and even.
Attachment to wood—Good.
Color of cappings—White.
Color of honey—White.
4.
Net weight—13¾ ounces.
Finish—Good.
Attachment to wood—Good.
Color of cappings—White, slightly stained next to wood, one side better than the other.
Color of honey—White.
5.
Net weight—13½ ounces.
Finish—Fairly good.
Attachment to wood—Good.
Color of cappings—White, very good.
Color of honey—Extra white.
6.
Net weight 14 ounces.
Finish—Fairly good.
Attachment to wood—Fairly good.

Color of cappings—White, very good.

Color of honey—Extra white.

7.

Net weight—14½ ounces.

Finish—Extra good.

Attachment to wood—Good.

Color of cappings—White, very good.

Color of honey—Extra white.

8.

Net weight—14 ounces.

Finish—Fairly even.

Attachment to wood—Good.

Color of cappings—White, very good.

Color of honey—Extra white.

9.

Net weight—13½ ounces.

Finish—Fairly good.

Attachment to wood—Fairly good.

Color of cappings—White.

Color of honey—White.

10.

Net weight—14 ounces.

Finish—Good and even.

Attachment to wood—Good.

Color of cappings—White.

Color of honey—White.

11.

Net weight—14 ounces.

Finish—Slightly uneven.

Attachment to wood—Good.

Color of cappings—White.

Color of honey—White.

12.

Net weight 14½ ounces.

Finish—Good, fairly even.

Attachment to wood—Good.

Color of cappings—White.

Color of honey—White.

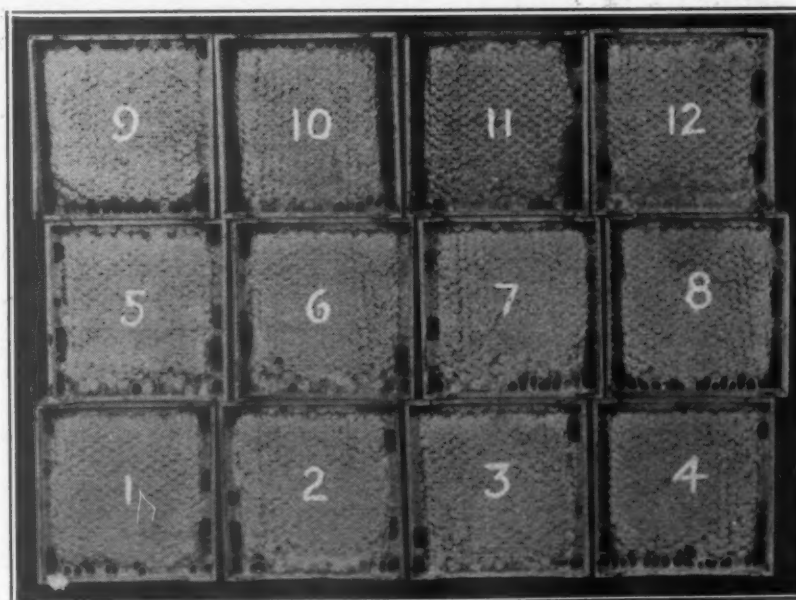
The Second Grade

Figure 4 gives a good idea of the kind of a section which should be graded as fancy. It is important that the rules be followed carefully and no section poorer than the following requirements be permitted to go into any grade. The requirements for fancy are as follow:

Sections must be well filled, combs firmly attached on all sides and evenly capped except the outside row,

next to the wood. Honey white or very light amber; comb and cappings from white to slightly off color. Comb not projecting beyond the wood, and the wood to be well cleaned; no section in this grade to weigh less than 12 ounces gross or 11 ounces net.

Under normal conditions in the average locality about 50 per cent of the crop runs to fancy grade. There is perhaps one point upon which these samples are not exactly representing the average carload shipments, in that they are running perhaps one-half ounce per section heavier than the average of the fancy honey will run in carload lots. However, insofar as these sections are expected to be stamped "net weight 11 ounces or more," we have even under average conditions considerably more honey in our fancy grade than the buyer who is not acquainted with Colorado grading would expect. But, those of our carload trade who have bought from us from year to year, are now perfectly familiar with this minimum weight proposition stamped on the sections and it seems to give good satisfaction. In our grading the limit of color of cappings and the attachment of the combs to the wood is a special feature and we find that on these points most of the graders fall down. The description of each section will give a fair idea as to how each section complies with the grading rules. There is quite a variation in color between the real white sections of fancy and those that are just simply the limit of color. An explanation in our grading rules gives the grader instructions that it is essential that in grading honey there should be a number of cases provided for the fancy and a still greater number of cases for the choice to allow each shade of color and finish to be packed in the same case, so that a uniform color and finish should be found in each respective case of fancy comb honey graded under these rules. Coming back to the weight proposition of fancy honey, we have found



Representative sections, showing variations permitted in fancy grade.

that, one year with the other, the average gross weight of fancy honey is 24½ pounds per case when weighed up by the truckload, and this makes about 13 ounces net per section.

Figure 5 shows a dozen fancy sections which are representative of this grade. Comparing them to the rules we have the following:

1.
Net weight—14 ounces.
Finish—Very good.
Attachment to wood—Good.
Color of cappings—White.
Color of honey—Extra white.
This section would grade extra fancy if a little better attached to wood.

2.
Net weight—14½ ounces.
Finish—Very good.
Attachment to wood—Very good.
Color of cappings—White.
Color of honey—Extra white.
Would pass for extra fancy but little blemish in cappings.

3.
Net weight—14¼ ounces.
Finish—Very good.
Attachment to wood—Very good.
Color of cappings—White.
Color of honey—Extra white.
Would grade extra fancy except trifle blemish to cappings.

4.
Net weight—13 ounces.
Finish—Good.
Attachment to wood—Good.
Color of cappings—White.
Color of honey—Extra white.
Would grade extra fancy, if it were better attached to the wood.

5.
Net weight—13 ounces.
Finish—Very good one side, fair on other.
Attachment to wood—Good.
Color of cappings—White.
Color of honey—Extra white.
Would grade extra fancy, except for uneven finish on one side.

6.
Net weight—13¾ ounces.
Finish—Very good, except slight projection on one side.
Attachment to wood—Very good.
Color of cappings—White.
Color of honey—Extra white.
Would grade extra fancy, but for slight projection of cappings on one side.

7.
Net weight—13 ounces.
Finish—Good.
Attachment to wood—Fairly good.
Color of cappings—White.
Color of honey—Extra white.

8.
Net weight—13 ounces.
Finish good.
Attachment to wood—Fair.
Color of cappings—White.
Color of honey—Extra white.

9.
Net weight—12½ ounces.
Finish—Fairly good.
Attachment to wood—Fair only.
Color of cappings—White.
Color of honey—Extra white.
Section not correctly folded.

10.
Net weight—11¼ ounces.
Finish—Fair.
Attachment to wood—Fair only.
Color of cappings—White.
Color of honey—White.
Would look better if No. 1 grade section had been used.

11.
Net weight—11¼ ounces.
Finish—Fair.
Attachment to wood—Fair only.
Color of cappings—Fairly white.
Color of honey—White.

12.
Net weight—14 ounces.
Finish—Fairly good.
Attachment to wood—Fairly good.
Color of cappings—White.
Color of honey—White.

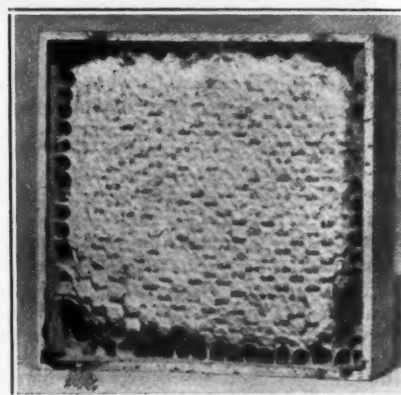
The Third Grade

Figure 6 shows a representative section of honey which grades as

choice. Much honey goes into this grade because it is off color, which would otherwise be included as fancy. Unfortunately, it is impossible to show these color variations properly in a photograph.

The requirements are as follows: Sections must be well filled, combs firmly attached, not projecting beyond the wood, and entirely capped, except the outside row next to the wood. Honey, comb and cappings from white to amber, but not dark. Wood to be well cleaned; no section in this grade to weigh less than 11 ounces gross, or 10 ounces net.

A considerable portion of shipping



Typical section of choice comb honey.

stock consists of Choice in seasons of slow flow, sometimes as much as 65 per cent and even 70 per cent, but under favorable crop conditions as little as 30 per cent will sometimes grade Choice, and a correspondingly larger percentage of crop will grade as fancy. Naturally, the variation in net weight, finish and color is greater in Choice than in Fancy, as we class Fancy White and white cappings, that are deficient in weight or finish so as not to be permitted in the Fancy grade, but which will weigh 10 ounces or more net each. On the other hand, this grade contains the heavy-weight sections that are darker in color than are permitted in the Fancy grade. Where the honey crop runs poor in color, there is occasionally for this reason only a difference of one-half a pound per case between the average weight of Choice and the average weight of Fancy in the same car. On the other hand, in localities where there is comb honey of good white color produced, there, the Choice will run probably one and one-half pounds to two pounds lighter in weight. The better color and keeping qualities of this light-weight honey offsets the difference in weight in many markets. In this particular grade we have been more careful to number the sections in the proper rotation of their color value, starting with No. 1 as the white, and so on down the line. In our classification of finish and attachment to the wood we have, of course, borne in mind what the requirements of the grading rules are for the respective grades. What may be called a good finish in Choice grade would likely be called a fair or poor finish in Fancy grade, and



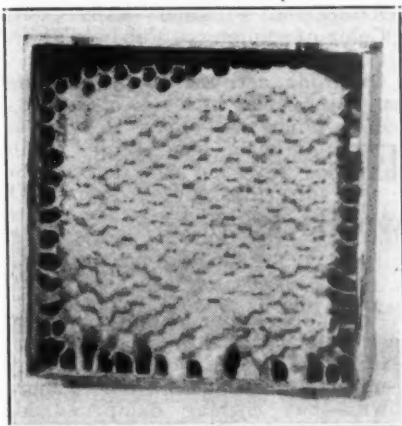
Sections which are good, but which are not quite up to the requirements of fancy, are graded as choice.

what would be called good attachment to the wood in the Choice, may be the very thing that was instrumental in eliminating this particular section from the Fancy grade, because it happened to be a little below the limit on that point.

We now refer to figure 7, which shows 12 sections graded as Choice, as will be seen by the following descriptions:

1.

Net weight—12½ ounces.
Finish—Good.
Attachment to wood—Fair.
Color of cappings—White.
Color of honey—Extra white.
Would grade fancy, except for attachment to wood.



Representative section of off-grade comb honey.
This section is discarded because of too many empty cells.

2.

Net weight—12 ounces.
Finish—Good.
Attachment to wood—Fair.
Color of cappings—White.
Color of honey—Extra white.
Would grade fancy, except for attachment to wood.

3.

Net weight—11½ ounces.
Finish—Good.
Attachment to wood—Fair.
Color of cappings—White.
Color of honey—Extra white.
Would grade fancy, except for attachment to wood.

4.

Net weight—14½ ounces.
Finish—Very good.
Attachment to wood—Very good.
Color of cappings—White.
Color of honey—Extra white.
26 uncapped cells containing some honey, otherwise this section would be extra fancy.

5.

Net weight—12 ounces.
Finish—Good.
Attachment to wood—Poor.
Color of cappings—Fairly white.
Color of honey—White.
Except for poor attachment to wood, would grade fancy.

6.

Net weight—11 ounces.
Finish—Good.
Attachment to wood—Poor.
Color of cappings—Fairly white.
Color of honey—White.

Except for poor attachment would grade fancy.

7.

Net weight—12 ounces.
Finish—Fair, rounded off one side.
Attachment to wood—Poor.
Color of cappings—Stained yellow.
Color of honey—White.

8.

Net weight—11½ ounces.
Finish—Good.
Attachment to wood—Poor.
Color of cappings—Fairly white.
Color of honey white.
Would grade fancy, except for poor attachment to wood.

9.

Net weight—12½ ounces.
Finish—Fairly good.
Attachment to wood—Good.
Color of cappings—Slightly off.
Color of honey—Light amber.

10.

Net weight—12 ounces.
Finish—Fair, somewhat uneven.
Attachment to wood—Fair.
Color of cappings—Stained yellow.
Color of honey—Light amber.

11.

Net weight 11¼ ounces.
Finish—Fairly good.
Color of cappings—Slightly discolored.
Color of honey—White.

12.

Net weight—11½ ounces.
Finish—Fair, somewhat uneven.
Attachment to wood—Fairly good.
Color of cappings—White, slightly stained.
Color of honey—White.

Off Grade Sections

We come now to that part of the crop which for one reason or another cannot be included in the shipping grades. Figure 8 shows a section otherwise good, which is discarded because of too many empty cells. Uncapped cells that are empty excepting those next to the wood are not permitted in either of our fancy and choice grades and to demonstrate that some otherwise good,

saleable honey will go on this account into the off-grade stock, we have selected 12 sections of good off-grade honey. The majority of these off-grade sections compare very favorably with some No. 2 sections graded by other rules than ours, but in adopting our grading rules we knew that the consumer's attitude in purchasing honey from retailers would be that open cells should at least be filled with honey, and if not, that such sections should be sold at a lower price. Furthermore, specialists in comb honey production will say that the proper manipulation of supers will prevent most of these troubles of empty and eaten open cells. The kind of off-grade stock represented by these 12 sections is generally sold in nearby markets, and is not offered to the carload buyer.

The following description of sections shown in Figure 9 shows why they are regarded as off-grade:

1.

Net Weight—12½ ounces.
Finish—Good.
Attachment to wood—Good.
Color of cappings—White.
Color of honey—Extra white.
Off-grade, account slashed in cleaning.

2.

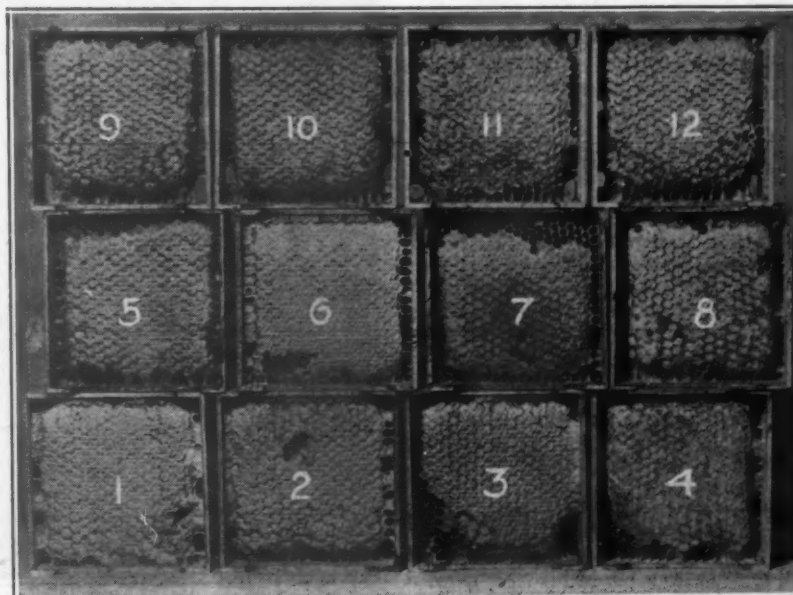
Net weight—11¼ ounces.
Finish—One side poor.
Attachment to wood—Fairly good.
Color of cappings—White.
Color of honey—Extra white.
Off-grade, account poor finish on one side.

3.

Net weight—11½ ounces.
Finish—Fairly good, except empty cells.
Attachment to wood—Fair.
Color of cappings—White.
Color of honey—White.
Off-grade, account empty cells (26).

4.

Net weight—10½ ounces.
Finish—Fair, except empty cells.
Attachment to wood—Fair.
Color of cappings—White, but



In the text Mr. Rauchfuss describes each of these sections and tells why it is off-grade.

slightly discolored.

Color of honey—White.

Off-grade, account empty cells (5).

5.

Net weight—12 ounces.

Finish—Fair, except empty cells.

Attachment to wood—Fair.

Color of cappings—Fairly white.

Color of honey—Extra light amber.

Off-grade, account empty cells (24).

6.

Net weight—15 ounces.

Finish—Very good, except damaged one side.

Attachment to wood—Good.

Color of cappings—White.

Color of honey—White.

Off-grade, account damaged one side and honey partly granulated.

7.

Net weight—10½ ounces net.

Finish—Good one side, other side quantity empty cells.

Attachment to wood—Fair.

Color of cappings—Fairly white.

Color of honey—Extra light amber.

Off-grade, account empty cells (50). This is maximum amount of empty cells per section for this grade.

8.

Net weight—11½ ounces net.

Finish—Fair, except empty cells.

Attachment to wood—Fair only.

Color of cappings—Fairly white.

Color of honey—Extra light amber.

Off-grade, account empty cells (7).

9.

Net weight—11¼ ounces net.

Finish—Fairly good, except for empty cells.

Attachment to wood—Fair only.

Color of cappings—Fairly white.

Color of honey—Extra light amber.

Off-grade, account empty cells (5).

10.

Net weight—12 ounces.

Finish—Fairly good, except empty cells.

Attachment to wood—Fair.

Color of cappings—Fairly white.

Color of honey—Extra light amber.

Off-grade, account empty cells, some eaten open by bees.

11.

Net weight—10¾ ounces net.

Finish—Fairly good.

Attachment to wood—Fair.

Color of cappings—Fairly white.

Color of honey—Fairly white.

Off-grade, account few empty cells.

12.

Net weight—11¼ ounces net.

Finish—Fairly good.

Attachment to wood—Fair.

Color of cappings—Fairly white.

Color of honey—Fairly white.

Off-grade, account empty cells and few eaten open by bees.

PASSING OF A PIONEER

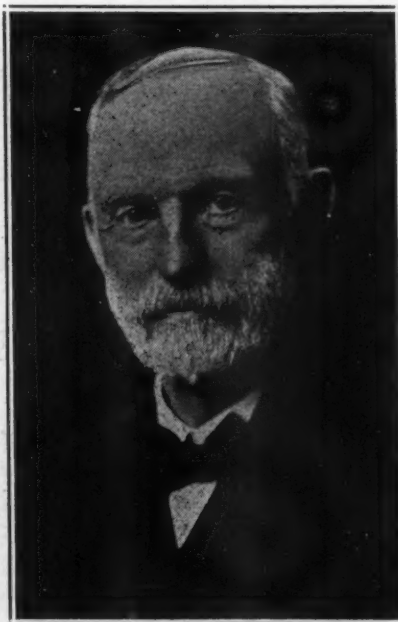
Some Notes of Appreciation of a Well Known Beekeeper

By Frank C. Pellett.

"A. I. ROOT rests from life's labors." So runs a telegram which reached the office of the American Bee Journal on the last day of April. One by one those who have laid the foundation of American beekeeping are passing away and leaving younger men to carry forward the work which they started with so much enthusiasm. Few of the old guard still remain. A. I. Root was one of the best-known among American beekeepers and hundreds who have been constant readers of his department in *Gleanings* will mourn him as a friend, although they may never have seen his face. He was a type of man to whom life offered a constant question mark. He was no longer interested seriously in a subject when he knew all that could be learned about it. He retained interest in living to the last, because he found so many new things to enquire about. Those who have read his writings through the years will remember a multitude of subjects to which he gave attention. From the first issue of *Gleanings*, in 1873, until he laid aside his pen shortly before his death, he wrote not only concerning bees, but flowers, fruits, vegetables, electricity, mechanics, tobacco, morality, religion, automobiles, flying machines, travel, poultry and many other things. Had he lived in health to be 100 he would doubtless have found new interests for every year, and perhaps for every day. It is to such as he that the world owes much of its progress. Constant searching is sure to unearth some treasures, and a question seriously propounded sooner or later must be answered.

Mr. Root's interest in bees extended over a period of 58 years. It was in 1865 that he secured his first bees, a stray swarm which chanced to pass where he was at work. He at once

purchased a copy of Langstroth's book on bees and began to study them in earnest. Soon after, he began writing for the American Bee Journal under the pen name of "Novice," and told with equal frankness the story of his failures and successes. Beekeeping was in a formative period just then, and most of the bees were kept in box hives. Along with Langstroth, Quinby, Charles Dant, and others of that period, the subject of our sketch tried every new thing which was suggested. Many things proved worth while and have remained, and many of their experiments proved unprofitable and have long since been forgotten except by those who love to thumb the pages of



A. I. Root, whose passing is widely mourned among American beekeepers.

the old publications of half a century past. He had his ups and downs; reading his early experiences, it may seem as if there must have been more downs—but nothing dampened his great enthusiasm. In 1867 he secured 1000 pounds of honey from 20 colonies and increased them to 35—an unheard of success for that day; but the following winter he lost all but 11 of his colonies.

There was much to be learned by the pioneer beekeeper. Extractors, comb foundation, sections, smokers and many other of the implements which we regard as essential today came to perfection through the combined efforts of the enthusiasts of the past generation who constantly sought new and better ways of doing things. To the final result Mr. Root made a large contribution. Just how much the beekeepers of America owe to him is impossible to tell. Some things he discovered and perfected, some things discovered by others he perfected. It is seldom that any important contribution to the progress of the race is due entirely to the work of one individual. We begin where others have left off and add our bit and others again take up the work where we lay it down.

He was always able to impart much of his own enthusiasm to his readers, and many who came to admire his teaching early in his career remained his followers through the years. *Gleanings* was started in 1873 and the early issues were very largely written by his own hand. A few years later he issued the first edition of the "A-B-C of Bee Culture," which has been revised from time to time and has continued to sell until the present. The book has run through many editions but some of his contributions to the first edition still remain.

Such intense activity requires fre-

quent change of scene or subject if the author is to survive. A growing business and heavy responsibilities so weighed upon him that he laid aside the active management of the business many years ago. His sons and sons-in-law have carried forward the business which he founded and he has given his attention to other things. The work of the church and moral

movements have claimed much of his attention, while gardening, mechanics and other hobbies have given an outlet to his enthusiasm.

A. I. Root was a unique personality who filled an important place in the life of his generation. He lived to a ripe old age and kept a place in the work of the world to the end.

A CHANGE IN HIVES

By E. M. Cole, Audubon, Iowa.

AFTER keeping bees for thirty years in small hives, mostly 8-frame, and in single and double story brood chambers in the production of extracted honey, I am about to change my system to the large hives with deep combs, and I will try to tell you why.

There was a time when I admitted that the 10-frame hive would produce about 20 per cent more honey than an 8-frame hive, but I contended that the larger part of this was left in the larger 10-frame body and so not available as surplus, and I still think that is about true. That was before Doolittle had given us the slogan of "Millions of Honey at Our House" for early spring breeding.

However, as the use of the double body came in and the practice of raising brood above the excluder and replacing with empty combs, I contended that I could produce as much honey from an 8-frame hive as from a 10-frame hive, by simply raising brood above the excluder a little oftener than with a 10-frame hive, and I think that is true, but my honey was costing me more in time and labor.

Later, in giving the queen the run of two hive bodies, I believed that I could produce just as much honey in the 8-frame hive as in the 10-frame; with two 8-frame bodies the queen has, in sixteen frames, all the room she can use and that is all she has in two 10-frame bodies. So under similar conditions, two 8-frame bodies will produce as large a force of bees as two 10-frame hives, and I believe the victory in honey production would go to the one containing the largest per cent of good, straight, unsagging worker combs.

But in using two hive chambers I found this difficulty. Queens rarely work back and forth freely in the two chambers, the tendency is to work into the upper story and stay there, thus losing the advantage of the laying space of the double chamber. As the brood emerges below there is a tendency to crowd the vacant cells with honey and pollen.

The queen on returning is not able to begin and lay continuously but must hunt for vacant patches of comb; this scatters the brood nest so that it requires a larger force of bees to keep up the proper temperature.

But if we could persuade our bees to respect the brood nest and store all the honey outside and above it, and train our queens to pass back and forth rapidly as the brood emerges, there would still remain the chief er-

ror of the double brood chamber, and that is the divided brood nest, and brood nest above, to be completely surrounded by a cluster of bees and kept at a temperature of 98 degrees, a brood nest below to be completely surrounded by a cluster of bees and kept at a temperature of 98 degrees, in addition there is the space between of top and bottom bar and bee space, and often a circle of honey under the top bar to be crowded with bees and kept warm. In figuring on the force of bees required to cluster around two brood nests, just figure on the amount of fencing required to fence 80 acres in two separate forties of land, then just move those two forties together and the same fence will enclose twice as much—160 acres of land. Now that is one of the virtues of the large hive with deep combs and the brood nest in one body; the same force of bees can incubate so much larger a body of brood, and with this brood in a compact body, the queen may lay in a circle from center to outside as far as the size of the cluster permits; as the brood emerges in the center she may return and lay continuously around the same circle as fast as the brood emerges and this continuous laying is, I think, a great factor in the future fortunes of that colony. Continuous laying means a continuous emergence of bees, so that a colony in a large hive has at the opening of the honey flow a large force of bees evenly proportioned as to age, and backed up by a large body of brood.

What advantage is there in an evenly balanced force of bees? You may be under the impression that if you have the force of bees, age is of no consequence. You are all familiar with the division of labor in the hive, one bee helps ventilate, another nurses the young, another secretes wax and builds comb, another carries water, and so on, but this is all done without a jar. No quarreling over this or that job, and I believe this is brought about by the age of the bee and the functioning of various organs. The first work of the young bee is probably nursing the young, prompted to do this by the development of the glands that elaborate the larval food, and it may continue this as long as the glands continue to function; as they become inactive the wax glands develop and the bee assumes the duty of secreting wax and to dispose of it builds comb, in time the activities of the wax glands subside and the bee becomes a fielder.

So I believe, as the bee ages, it is forced on from one duty to another, and a constant flow of bees from the brood nest to the work shop is needed to take up each duty in turn as other bees pass on to other departments. That bees are somewhat flexible in their ability to take up different duties at other ages is true, but if by manipulation you break up this even flow of bees from the brood chamber, and cause field bees to remain in the hive until their shrunken wax glands can be brought to function, or wax workers held back to nursing brood when comb is needed for storing room, it will always be at a loss.

To illustrate: In the height of broodrearing, if the brood chamber becomes congested with brood and honey, the queen is forced to slack up in egg-laying or almost stop for a few days and, even if conditions are such that no swarm is cast and the colony is held together, looking forward 21 days, you will see a sudden drop in the emergence of brood, and a few days later, as the nurse bees pass on to wax producing and comb builders, there are few nurse bees to assume their duties; later, as these same wax workers should take their place as fielders, comes a sudden drop in the number of wax workers, and if bees are held back to do their work your force of harvest hands is reduced just that much, the very force that you have been working all season to produce, and you will not have a full force again that harvest.

The small brood nest or the brood nest occasionally dislocated by manipulation can never give a continuous flow of bees into the supers ready at the proper age to carry on every department of labor in the hive. But in a large hive body, with deep combs and a compact brood nest, the harvest opens with plenty of bees of the different ages to carry on the different activities of the hive, and these bees, by early supering, are directed away from the swarming impulse and toward the storing impulse. Every day a full quota of bees emerge and pass on from one department of labor to another, and supply every day a full quota of harvest hands.

The point which I wish to make clear is that in adopting the large hives with deep combs I will be able to dispense with much of the manipulation usually required and have a larger force of bees ready for the harvest. Another point, if you think that a continuous succession of bees to provide for nurse bees and wax comb builders is unnecessary, that old bees may or will do the work, please remember that the only place you can get this supply of older bees is to take them from the harvest field.

Beekkeeping in Tennessee.

"Tennessee Agriculture," Volume 52, No. 12, is a 32-page report on modern methods for Tennessee beekeepers, by J. M. Buchanan. It describes modern improvements, cures of foulbrood, etc. It ought to be in the hands of every Tennessee beekeeper.

THE LARGE HIVE FOR COMB HONEY

By C. P. Dadant.

I AM asked to write an article on the above subject and at the same time my attention is called to the fact that I wrote on this matter, in the American Bee Journal for January 5, 1899; and after reading it over I can see nothing to change in the statements which I made then, though I can add something to it from the experience of our deceased friend, Dr. C. C. Miller.

The main drawback to the production of comb honey with a large hive resides in the incapacity of some queens to fill all the combs with brood, preparatory to the honey crop. The purpose and advantage of the large hive are to enable the most prolific queens to lay eggs to the utmost of their capacity, previous to the opening of the crop, thus furnishing an immense population for the harvest. But if our queens are not prolific, if they cannot fill the combs full of brood, with just enough room in them for the current needs of the colony, in honey and pollen, then the empty cells are filled with honey by the bees, when this honey ought to be located in the supers.

The average honey producer who watches his bees and follows their progress well knows that the desire of the bees is to place the honey above the cluster in just as close proximity as it is possible for them to have it; since their purpose in storing honey is to have it for the bad season, within easy reach of this cluster. So when our bees have empty cells in the brood chamber, they hasten to fill them with honey, and this honey is unavailable for the sections. On the other hand, if the bees find their broodchamber full of brood, and ample room is given them, in easy reach, in the sections above, the active force will move up to the sections and will fill them readily, leaving a fresh field to the queen and nurses, for when the cluster of active bees once moves to the upper stories, there is no longer a tendency to crowd the queen.

Too much breeding room for the queen is, therefore, a hindrance to the production of honey in sections. This matter was thus described by another deceased leader in beekeeping, cited by me in the above mentioned article, G. M. Doolittle:

"If the queen has all the vacant cell room her prolificness requires, more room is only a damage to our crop of comb honey, for in the finding of vacant cells in the brood chamber, at the beginning of the honey harvest, comes an accustomance to the brood chamber for storing honey instead of the sections, and thus the queen is crowded upon with honey instead of said honey going into the sections. . . ."

I believe that the reader now sees the matter clearly, so that he may know the principal objection to a large brood chamber for comb honey, with an inferior queen.

This defect was long ago noticed by some of the largest producers of comb honey in large, deep-frame hives, at the head of which I believe I can place another of our deceased experts, Mr. P. H. Elwood. Mr. Elwood simply reduced the capacity of the brood chamber of his hives to the actual number of combs occupied by the queen with brood, at the beginning of the honey crop.

Likewise, our old friend, Dr. Miller, reduced his brood chamber to one story 8-frames instead of two, when the crop began. But he did not always follow that method. If we read his early works, we will see that he first began with one single story of 8 and 10-frame hives, Langstroth size. In his "A Year Among the Bees" (1885), he shows that even with shall hives, there is a possibility of the bees crowding the queen with honey that ought to be in the super. He wrote:

"If honey is stored in any part of the brood chamber, and all the space is not needed for brood, the bees seem to get in the way of thinking that there is the proper place for storing, and possibly, through habit, continue storing, even after it encroaches on the room needed by the queen. This results in two evils, viz.: The nice, white comb honey, that we want in the sections, is stored in brood combs; and the bees are pretty sure to swarm. On the other hand, if only enough room is left to barely meet the wants of the queen, that seems to be left entirely for her, and the combs are filled with brood clear to the outside. On this account, I reduce the number of brood combs to four or five, when putting on supers."

This was "contraction" with a vengeance. The reader must bear in mind that, at that time, several of the leaders in beekeeping, Heddon, Hutchinson and others, believed in small hives, still farther reduced during the honey crop, until all profit was gone out of the business. Dr. Miller followed this for a while, as the above shows. But in his "Forty Years Among the Bees," published 18 years later, in 1903, or 4 years after my article above mentioned was published in A. B. J., we find Dr. Miller giving the queen all the room she can occupy, in two 8-frame stories. He wrote:

"Up to the time of putting on supers, the queen has had unlimited room, with the design of encouraging the rearing of as much brood as possible. When the harvest begins, she may have as much as 6, 9, 11, up to 14 frames well occupied with brood and eggs. . . . It seems that when a colony is so strong as to have 12 or 14 frames of brood, there ought to be no difficulty in having good super work done by putting the supers above the two stories; and

one season of failure the only super I had filled was on a two-story colony. But I was never able to have that thing repeated, and whatever the reason may be, I have not been able to make a success of putting comb-honey supers on two-story colonies. . . .

So before putting on supers the colonies are reduced to one-story each. If a colony has 9, 10 or more frames of brood, all but 8 are taken away. The surplus frames of brood are given to those that have less than 8 frames of brood each, the effort being to have in each hive 8 frames well filled with brood when a super is given."

It was with this method that Dr. Miller made a record crop of comb honey. But we must remember that, when he did so his weak colonies were run for extracted honey, else the average of comb honey per hive would have been very much less.

Thus our reader must see that, in order to secure as large a crop of comb honey as the colonies can yield, it is necessary to anticipate and prevent the storing of honey largely in the brood combs, by contracting the brood chamber to the exact amount of space fully filled by the queen. The advantage of this sudden contraction is that the excess or overplus of working force is at once compelled to occupy the supers, and in some cases a single comb-honey super is insufficient for them. The combs containing no brood, or only a small amount of brood, are given to weaker colonies. The brood chamber of the large hive is narrowed by the use of a division board. This was the method used by the eastern beekeepers, among whom Mr. Elwood was one of the most successful; it was our own method as well, when we produced comb honey.

We ceased the production of comb honey for ourselves, for several reasons. The main one is that there are always more natural swarms than when we can supply the colonies with super combs already built in endless numbers; even if we follow the main requirements of plenty of ventilation, shade, young queens and few drones. We also found extracted honey more profitable; but just now comb honey seems to have the ascendancy. However, let me assert that, just as I stated in 1899, if I were to produce comb honey, I would still do it with large brood chambers.

I might repeat what I wrote in 1899, that we have no pecuniary interest whatever in the use of large hives by others, no ax to grind, no patent, never did have, and do not care—no, not a copper cent, whether anyone tries our methods or not. Perhaps that is why people are more likely to listen to us, when we argue these questions. But I acknowledge that we have been the champions of large brood chambers for nearly 50 years, for it was Charles Dadant who first computed how much brood room would be necessary for the average prolific queen, if we wanted to secure all the worker bees that she could produce for the honey crop.

✓ PROFITABLE SWARM CONTROL

—Extracted Honey Production.

By Wallace Park, Iowa Experiment Station.

THE desirability of elimination of swarming is a foregone conclusion. Each of the various methods advocated has its advantages under certain conditions and for certain systems of management. For instance, a method that is well adapted to the use of the side-liner often is unsuited to the requirements of the commercial producer. A method which may be most successful in the production of extracted honey cannot be employed satisfactorily in comb honey production. Colonies kept in large hives, such as the Jumbo or Modified Dadant, often go through the season with little or no inclination to swarm. Control measures which are quite adequate for colonies in this type of equipment need not, as a rule, be radical. The great majority of bees in this country, however, are in Langstroth equipment, and with this swarm control is a problem.

The Demaree Method

The Demaree plan is popular among users of Langstroth equipment, and justly so, for it requires a minimum of manipulation, yet seldom fails to prevent swarming. In its various modifications, it has come to be looked upon by many beekeepers as a sort of panacea for the swarming evil. But experiments recently conducted at the Iowa Experiment Station showed that swarming was often controlled by this method at the cost of a considerable reduction in the amount of surplus stored by the treated colonies. In some cases treated colonies stored only two-thirds as much surplus as colonies that were not Demareed. It was found, however, that under the following conditions, the Demaree method could be employed with the production of maximum yields:

1. A honeyflow lasting at least four weeks.
2. Colonies strong enough by the beginning of the honeyflow to absorb the shock of treatment.

Mr. Demaree explained his plan thus: "At the commencement of the swarming season . . . I begin with the strongest colonies and transfer combs containing brood from the brood chamber to an upper story above the queen excluder. One comb containing some unsealed brood and eggs is left in the old brood chamber as a start for the queen. I fill out the brood chamber with empty combs, . . . but full frames of foundation may be used in the absence of drawn combs."

Many beekeepers follow the plan as originally given; but in some seasons and especially in some localities, more or less swarming occurs, even in colonies so treated. In an attempt to eliminate swarming still more effectively, various adaptations of the plan have been used with consider-

able success. The best known of these is the one advocated by Dr. Phillips and Mr. Demuth in their lectures at beekeepers' short courses throughout the country. This modification differs from the original in only one essential point. Instead of using the hive body of sealed brood as the second story, it is used as the fourth or fifth, with two or three supers of extracting combs between it and the new brood chamber containing the queen. This method is so effective in the prevention of swarming that even such strong colonies as result from the use of a 2-story brood-chamber during the fore part of the season, are held together throughout the honey flow with little danger of swarming.

The most potent cause of swarming is thought to be a super-abundance of nurse bees in the brood nest. The efficiency of the Demaree plan of swarm control probably is due largely to the removal from the brood chamber of a large proportion of nurse bees, for they will not desert the brood. As was to be expected, experience has shown that the farther the brood and nurse bees are removed from the original brood nest, the greater is the effect in destroying the swarm impulse. This is shown by the fact that the modified Demaree plan mentioned above is more effective than the original. Such treatment, however, cannot be other than a severe shock to the colony. In the experiments mentioned above, strong colonies were found to be able to absorb this shock under favorable honeyflow conditions; but under less favorable conditions, even strong colonies took a slump in production from which they did not fully recover that season.

Method for the Commercial Producer

The commercial producer cannot tolerate the swarming nuisance. He must control swarming even at the cost of bees, if the method employed is not incompatible with maximum yields per colony. He can keep enough more colonies to maintain the total production from his yards. Any measures that are sufficiently drastic to control swarming when applied in a wholesale way, will work havoc when adverse conditions arise unexpectedly. But the large producer has little choice; he must control swarming and take his chances on reducing the yield at times. In localities where the main flow does not begin too early and lasts several weeks, as it does in the sweet clover regions, the Demaree plan, or some modification of it, is well adapted to the needs of the commercial producer of extracted honey, in that manipulation is reduced to a minimum with a maximum of swarm control.

Methods for the Sideliner

Whereas, the commercial producer

would be swamped with swarms if he attempted to treat only such colonies as were actually preparing to swarm, the sideliner, with his few colonies, should be able to look with complacency on the ever-increasing strength of his colonies. Of course, he should provide adequately for the needs of each colony by giving plenty of room for brood rearing and for honey storage. The sideliner can know his colonies as individuals and, if he is wise, will manipulate each one according to its peculiar needs. While little harm is likely to result from Demareeing a very strong colony, such treatment when applied promiscuously is almost sure to result unfavorably in many instances.

It is well known that many colonies, although they become very strong, often go through the season without swarming, even though no special control measures have been employed. Such colonies usually are high producers. In the light of the results obtained in the experiments mentioned above it would appear to be useless, if not detrimental, to subject such colonies to the shock of Demareeing, or any other drastic control measures.

The sideliner who is thoroughly familiar with honeyflow conditions in his locality may see his way clear to Demaree his strongest colonies, particularly if he is short of time to care for his bees; but let the less experienced follow a course that will accomplish the desired end without so much risk of administering an overdose of swarm prevention.

Large Hives

It is much easier to prevent the swarm impulse than to eradicate it after it is once established in a colony. One of the very best ways to head off the swarm impulse is to provide a brood chamber large enough to permit the queen to lay to her capacity. For this reason, large hives such as the Jumbo and the Modified Dadant, have come into great favor during the last few years. In large hives, strong colonies may be developed without bringing about a congested condition in the broodnest. The wide spacing of frames, as used in the Modified Dadant hive, appears to be an additional factor in swarm control.

Those who use Langstroth or other small hives will do well to use two-story brood chambers. The difficulty here is that some queens hesitate to pass from one story to another. Usually a queen will pass up to the second story readily enough, but after she is once up she is not inclined to go back down again. In this case it is a good plan to interchange the two bodies so as to have the one with the least brood for the second story. When a queen continues to confine herself to the lower hive body, it may be necessary to move several frames of brood to the second story and replace them with empty combs. This prevents congestion in the broodnest and allows the queen to lay to her full capacity.

Putting on Supers

Supers should always be given a little before they are actually needed so that the colony need never lack for storage space. When the first super is about half filled, lift it up and insert an empty one beneath it, and whenever a new super is added, it should be placed next to the brood chamber. It is the nature of honeybees to store their honey immediately above the brood, and so long as storage space is available in that region they are less inclined to swarm. Bees are guided by but one instinct at a time, and as long as the storing instinct can be kept dominant, swarming is automatically excluded; and it has often been observed that swarming is less prevalent during a heavy honeyflow than during a moderate one.

Killing Queen Cells

In spite of large brood chambers and proper methods of supering, an occasional colony will prepare to swarm. Each colony should be examined carefully every eight days during the swarming season in order that any preparations for swarming may be detected promptly. Look over every frame of brood and destroy any queen cells found. They are quickly killed by mashing the cell with the finger or hive tool.

A colony having cells that are not yet sealed will sometimes give up further preparations if the cells are destroyed, but a colony which has capped cells is not so easily dissuaded from its purpose, and often requires other treatment. Killing such cells will usually delay the issuing of the swarm, but should be employed simply as a temporary measure, to be followed by specific treatment about eight days later, if the colony again builds cells in number.

Specific Treatment

When a colony is found that requires specific treatment early in the season when there are prospects for a honeyflow lasting four weeks or more, the Demaree plan may well be employed. Later in the season or when the honeyflow promises to be short, the colony may be kept queenless for a period of 10 days, after which the old queen may be returned or, better, a young one introduced. Of course, the colony made queenless will build cells, which should be destroyed eight days after the removal of the queen. In some instances it may be desirable to allow the colony to rear a young queen after killing all cells but one, or by giving a cell from better stock.

The purpose of this paper is not to explain in detail the various methods of swarm control, but rather to give a sort of birds-eye view of several well known methods; and to point out the fact that the sideline, as a rule, can control swarming most profitably by employing methods that are less drastic than the Demaree.

✓ SWARM CONTROL

By J. E. Crane.

HOW shall we bring swarming under control? "Simple matter," some one will say, "just take away the queen and cut out queen cells or shake into an empty hive and you have 'em."

Quite true, but that is not the whole story. What we want is to keep our bees at home and at the same time secure a large yield of honey. To do this we must begin by having all our queens' wings clipped. This will keep swarms from going away in our absence. Then, as the swarming season comes on we must open our hives every eight or nine days to know just what is going on. If we find a colony preparing to swarm by starting queen cells, and it is strong and has a young, vigorous queen we may shake the bees from their brood onto drawn combs, or if we do not have a good supply of them, we can give it one or two drawn combs and fill out with frames of foundation and return the super. This will usually control or check swarming for the season, but there is one drawback to this method, unless the honeyflow is abundant the colony dwindles very rapidly, as there will be no hatching brood in the hive for the next three weeks if left to themselves. So, in eight or nine days we open again if there are not sufficient bees to do good work in supers we can take out two or three combs not yet occupied with brood and give them as many combs of hatching brood. Such colonies often do better than those that have made no preparations for swarming.

As we go over a yard of bees we shall doubtless find a good many colonies that removing their brood would render them unproductive for the season. Such colonies have an old queen, or what amounts to the same, a poor or failing queen. Their hive is not yet full of brood. They are doing but little in supers. What shall we do? Just this, we will remove the queen instead of the brood and all combs without brood, and replace with combs of hatching brood that we have taken from some other hive. We will also cut out all sealed queen cells. But what if we cannot find the queen, as often happens? Why—we can cut out all queen cells and close up after giving them all the brood the hive will take. Next time over we will try again and if we do not find the queen, cut cells as before, and again close our hive. Such queens will usually disappear within two or three weeks, when we may give them a virgin queen which will usually be readily accepted. Giving such colonies extra brood quickly, makes them strong enough to do good work in supers. The combs we have removed half or two-thirds filled with honey are just what we like best to give hives where we have removed the brood, as it will be quickly carried to the supers. We prefer an 8-frame hive for section honey, as we can go through

such hives faster and can crowd bees into supers quicker, and 8 frames of solid brood will keep up the strength of a colony very well. An active man with a good helper can go through a yard of one hundred colonies in a day, but he can do better work with more help.

I hardly know why bees work better in sections when in a small brood chamber than in a larger one, but it seems to be a fact. Some years ago, before I tried to control swarming, I had a colony on eleven combs. They did nothing in the super until one day it swarmed. I was disgusted that it should be strong enough to cast a swarm and do nothing in the super. I reduced the size of their brood chamber by division board and removing part of the combs, and it went to work in the super at once, notwithstanding their great loss of bees.

There is a great difference in seasons. Methods that will work one year may not the next. Some years just cutting out queen cells is sufficient to check swarming with many hives, but in other years of little use. Some years removing all the brood will not even avail for they will quickly fill the drawn combs given them and start queen cells and are ready to swarm, and the brood combs or the queen must again be removed to prevent their determination to swarm.

It is much easier to control swarming where a yard of bees is run for extracted honey. Before I had had much experience I thought all that was necessary was to give a large brood chamber and a plenty of supers; but I found in practice it did not work. I bought a yard of ten colonies some ten or twelve miles from home, which I run for extracted honey, only to find, I think, one-half of them wanted to swarm. Later I learned it was not only necessary to give an abundance of super room above the brood chamber, but also to get the bees to storing in them as soon as possible. To do this all that was needed was to raise two or three combs of brood from the brood chambers to the super above early in the season as or before the harvest began. We may be sure the storing of honey will follow the brood above. Even with this precaution, colonies having old or poor queens are liable to swarm as the supersedure of a queen is apt to be an excuse for swarming, but this is trifling if suitable care is taken to weed out old queens.

After all, much will depend on the skill of the apiarist, but really I think it the most interesting and fascinating work connected with keeping bees. By this method one man with a good helper can care for five or six hundred colonies in five or six yards, when run for section honey, and look after surplus honey. Indeed he should do better than this with a good auto truck.

THE HUBER LETTERS

About Propolis—How Bees Strengthen Their Combs with Threads of Propolis, in the Angles of the Cell Walls.

(Continued from May).

July 10, 1830.

As I wish to inform you about an observation with which I have been greatly interested and of which I have not yet spoken, I must first bring you to the level of already acquired information when I began to study bees, and what I did to ascertain that my forbears had spoken according to nature.

It is about propolis that I wish to write. This word, of Greek origin, is applied to a substance intended to surround or fortify a city or village. The bees have built, under my eyes, bastions Vauban fashion, composed of this matter and of pure wax, and use it also to protect their homes from any noxious thing, by varnishing the walls with it.

You have perhaps already seen propolis, on the legs of your bees or on the glass of the observing hives; the red color was noticed by you. They say, chemically speaking, that it is a gum-resin; my own tests have taught me that it is in the nature of gum and of rosin; but did the bees take it from the Lombardy poplars? Their odor struck me as resembling the odor of propolis. To make sure of it, I made the following experiment:

In a fine day of July, I took from some Lombardy poplars a few branches with their buds. To see them more at ease, I had them taken to my study; they were placed by the side of a glassed hive which had no outside opening. The bees, attracted by the odor of those buds, were not long in coming out and showing us that they were interested in them. They began by removing the bracts and taking with their mandibles that which covered them; they loaded with it their pollen baskets and withdrew to their hive.

Those same bees paid no attention to branches of other trees which we had mixed with the poplar branches. This experience, repeated, left no doubt that the Lombardy poplars can furnish propolis to the bees, but were they the only plants upon which they could gather it? I cannot decide it.

Observation on a peculiar use of propolis. Tardigrade speed is my speed, and this is not astonishing, in view of my circumstances; it would be still more astonishing if I had made much progress with the means and the instruments at my disposal.

The principal or even unique purpose of the care the bees take is to give their work the greatest strength possible, and to prevent entirely the fall of the combs and the ruin of the colony.

In 1801, I lived at my children's in the vicinity of Lausanne. I had brought my bees with me. . . The first swarms which I had at Ouchy

were hived in glass hives, of which the ceilings as well as the sides were transparent. The observations which we made with them were only the repetition and confirmation of those described by Reaumur, but they had for us the merit of novelty.

One day, however, the hive which drew our attention happened to be in a light which enabled us to see a peculiarity which we had never yet seen.

A great number of bees, having upon their legs some bright substance, and running to and fro, came in great numbers into this glass hive. We saw distinctly that it was in the pollen baskets that they were bringing the bright substances which had caught our eyes; their color would have caused youthful eyes to take them for rubies, but we could not be fooled in this: it was propolis which these bees were bringing; we caught some of them as they were entering the hive. It was enough to touch these pretended rubies to recognize the gum-resin which was known to the ancients and which the name given to it by them showed that they knew its use.

In its fresh condition, before it is dried, this substance has a property similar to that of all glutinous substances, that of stretching at will, in threads; it is soft, malleable and does not break. It was through this property that the bees made use of it in this occasion under our eyes.

1. Among the great number of bees using this material, we select those that we can best see; hanging to the comb, with their heads toward the cells, they appear to feel with their antennae the propolis which they have just deposited there.

2. The greater number of them feel with their mandibles those little propolis balls.

3. They do even more, they manipulate with their teeth this gummy matter, which the warmth of the spot and their manipulations have softened.

4: After many efforts and twitching, we see them leave the little pellets, carrying away in their jaw what they have removed from them.

5. Examining them with a magnifying glass, those objects appear to be threads of propolis of different lengths.

6. As if they were intending to measure them by the length of the cell, they carry them into the hexagonal tubes. What they do within the cell is entirely hidden by their body. When they come out, we sometimes see them coming back with empty hands, it is when the thread of propolis has proven of proper length; in that case it is easy to perceive that the worker has laid it at the joint of the two faces of the hexagonal tube and that she has stretched it by pressing it into the place which it is to strengthen.

7. It often happens that the little thread of propolis is not of proper length; if it is too long, a nip shortens it; in the opposite case, the little pellet supplies what is missing.

8. That which astonishes me is

to see that it is not the same worker who finishes what she began; each one that successively does it takes up the work where the previous one has left it without any irregularity being caused by this change of hands.

9. We have not seen the bees strengthen the pyramidal bases of the cells, as we saw them fix the hexagonal tubes, this was impossible, but the dissecting of the bases showed us that they had been treated in the same manner in all parts of the hive.

10. When the work in wax is interrupted by drouth, and by any bad weather which prevents the secretion of honey in the flowers, the first symptom of this suspension is indicated by a rim of propolis with which the bees strengthen the rims of the cells which have not been built out at full length, and as these interruptions in the work take place at different times each summer, one may learn their number by that of the rings of propolis which rim their edges evidently with the view of protecting the cells from any defacement.

11. Reaumur knew too well the lightness of the cells and their extreme fragility not to understand that the bees would look after it; he had ascertained that their edges were thinner than a sheet of paper; so when they were new the trace of the fingers was noticeable upon the combs and the least added weight was sufficient to break them. It was through new wax added in the weak places that the workers averted this danger and gave their combs additional strength.

12. One now sees that they strengthen them still more by adding propolis, the threads of this material, arranged in shape of buttresses inside of the cells and artistically placed in the points of contact of their trapezes, are that which is best to tie more intimately the wax with the propolis and give the bees' work all necessary strength.

13. In order to see this ingenious artifice, it was necessary to detect them when they were busy with it; it would not have passed unobserved by Reaumur. This becomes invisible when the angles of the inside prisms are covered with the silky shells which the nymphs leave behind in the cells when they come out as adult bees; the number of shells which are left successively in them without interruption necessarily destroys their transparency. Swammerdam counted 17 of them in a single cell.

To see this new feature in the history of our bees one should: 1. Separate a cell; 2, put in on the surface of water; 3, heat it. The wax, more readily fusible than propolis, will melt at about 50 deg Reaumur (about 157 deg. F., it actually melts at a lower degree.—Translator); propolis will not melt at this degree, the prism will preserve its shape; the shells, having assumed the shape of the cell within which they were formed, will retain the edges that could be perceived before the melting away of the wax.

(To be continued).

BEEKEEPING IN JAPAN

By Yasuo Hiratsuka

BEEKEEPING in Japan dates back 1280 years. Japanese history tells that "in 644 A. D., there was in a Japanese metropolis a prince of Kutara (an ancient kingdom in Korea) whose name was Yoho, and that he kept a colony of bees on Mt. Miwa, near Nara. However, these bees disappeared, taking with them four combs." What caused this disappearance? That is not recorded. The bees kept by the prince were, of course, the Japanese native bees, *Apis Indica*. This is the oldest mention in literature concerning beekeeping in Japan.

In the year 739 A. D. it is recorded that a Chinese Imperial messenger came to our country and brought some mitsu (honey) with him. This is the first mention of honey in our historical literature. After these dates the honeybee, honey and beeswax are found frequently mentioned. In these early days, of course, bees were kept for the most part in box hives; empty barrels were frequently used.

On the 10th of May, 1876, the Agricultural Department imported Italian bees from the United States, and in 1879 Mr. S. Takeda imported European bees into Ogasawara Island and kept them according to modern methods. Later European races were imported frequently and beekeeping in Japan increased and developed rapidly.

Since 1906, beekeeping has flourished. At first most of the beekeepers made their money from selling bees, without much reference to honey production, but there has been much attention of late years to the business of honey production. In 1915 migratory beekeeping was practiced on quite a large scale. Our honey is mostly extracted and the demand for it is not very large.

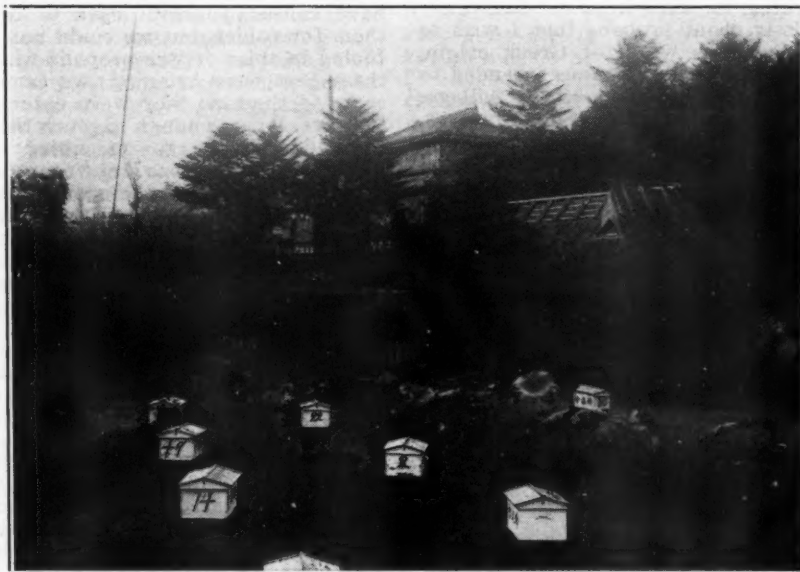
Beekeeping Organizations

There are no real organizations of beekeepers in Japan. Statements are frequently made concerning the activities of Japanese beekeepers' associations under various titles: the Japanese Beekeepers' Association, the Japanese Honey Producers' Association, the Oriental Beekeepers' Association and other names. Yes. They exist in name only and have no members. It is the custom of bee supply dealers to use these names for adver-

organize our beekeeping activities, but the time is not yet ripe. Those who are in the lead are too selfish and too much concerned with money-making and our honey producers themselves are not yet fully awakened to their needs.

Government Activities

There is only one experimental station in Japan which is concerned with beekeeping. The apiarist at this station, however, does not do much to educate beekeepers in practical matters, nor does he write very extensively for our bee papers. He occasionally speaks in conventions and is mostly concerned with researches



Japanese apiary and honey house on the grounds of a prosperous beekeeper.

tising purposes. I am sorry to have to confess this, but I do so because American and European beekeepers are not well informed as to the facts and will be misled by these attractive names. We Japanese beekeepers know that it would be well for us to

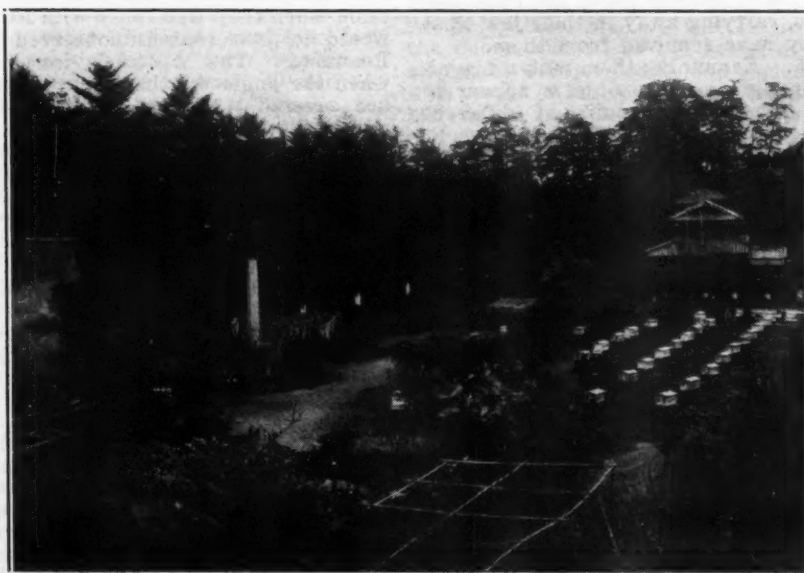
concerning the various races of bees. I understand that he is studying for a doctor's degree and we hope that in the future he may give us practical bee folks definite attention.

Bee Journals and Apicultural Education

There are six monthly publications in Japan which are named as follows. The "Toyo no Yoho" (Oriental Beekeeping), the "Yoho no Tomo" (Friend of Beekeepers), the "Jitsugyo no Yoko" (Beekeeping as a Business), the "Yoho Shishin" (Load-stone of Beekeeping), the "Yoho Kwai" (the World of Beekeeping), the "Nippon Yoho Zasshi" (Japanese Bee Journal). All of these are published by supply dealers and the contributors all practical beekeepers. Japanese beekeeping is developing through the efforts of these practical men, almost without any scientific aid. Some of the contributors are familiar with English and are introducing the best from American and British publications. These men are much looked up to by less well educated beekeepers.

Beekeeping Equipment

Beekeeping in Japan is following the American methods almost en-



The Japanese are artistic people. The apiary with its beautiful surroundings is a restful place

tirely. Our hives are nearly all 8 or 10-frame Langstroth, but a few beekeepers use the so-called sectional hives, also the Dadant hive. There is a hive called the Japanese hive which has a frame about one-third the length and about the same depth as the Langstroth frame. Our hive covers are not flat, because we have such heavy rainfall.

Most of our other equipment is the same as that used in America. One exception is in the Taitoph queen cage. It is said that this type of queen cage was made after some Russian design. It is an inverted wire cage having a lid at the top to suspend the cage in the hive and a lid at the bottom which is opened to release or feed the queen.

Our comb foundation is manufactured in Japan and foundation mills are common. Much of the foundation is home-made and all of it is inferior to the American-made foundation. It is more brittle, although some of it is well accepted by the bees and does not seem to have the tendency to sag that the American foundation has. The wooden parts of the beehives are made from so-called Sugi (*Cryptomeria Japonica*). Hives made from good Sugi are better than Cypress hives. The average beekeeper uses Japanese made equipment because it is expensive and inconvenient to order from America, especially for those who do not understand English. We have one dealer who advertises American goods.

Races of Bees in Japan

Our native race of bees, *Apis indica*, is common, especially in mountainous regions. They are not productive and modern beekeepers do not keep them. Carniolan, Caucasian, Cyprian and Banat bees have all been imported and kept in apiaries, but there is no pure stock of these races at present, with the exception of the Carniolan. The three-banded Italian is widely kept in Japan. Many beekeepers admire the the so-called golden bee and there is some advertising of the so-called leather colored Italian, which some claim to be long-tongued. I do not know that we have distinct type of bees of this sort. The British golden bee, which Mr. Sladen sold in England some years ago, has been exploited to some extent in Japan and some beekeepers made considerable money from them. This bee is pretty wide spread.

The Japanese native bees, *Apis indica*, do not hybridize with *Apis mellifica*, and all our hybrid bees are the results of crosses between races of *A. mellifica*. In my opinion, the first cross of bees should be made between two pure races and not by the mating of a pure queen and a hybrid drone. Hybrids are considered very valuable by many beekeepers. Some dealers sell the first cross of a pure queen with a hybrid drone, advertising it as a first cross, but to my notion this is not correct.

Beekeeping Sections

The Gifu-ken is the most prosperous territory for beekeeping, together with the neighboring territory of Aichi. This is in reality the best beekeeping part of our country. Most of the bee supply dealers, honey producers, queen raisers and many of the bee publications are found in the Gifu and Aichi Kens. Many migratory beekeepers come to Gifu and Aichi Kens for the principal honey flow, since the Genge plant in these two kens is famous for honey production and for the extent of its cultivation. In the spring months some hundreds of beemen and 20,000 or more colonies of bees are to be found in these two provinces. After the honey flow the migrators go to Hokkai-do in early June.

The Hokkai-do is the northernmost island district in Japan and those who left Ai-Gi in early June, harvest summer and fall flows in Hokkai-do, and may again migrate to Kagoshima, the southernmost part of Japan, and neighboring kens or districts in the Kiushu Island and some come back to Ai-Gi ken about October.

The Kagoshima and other districts in Kiushu island have a mild climate and those who migrate or who are permanently located in these parts of Japan have no winter problems and bees breed so early that they swarm in the latter part of February or the middle of March. Often crops of honey are harvested in April.

There is another district famous for beekeeping, that of Nagano-ken. The Nagano-ken is the Japanese-Alpine region, because it is located at a high elevation and abounds in large and high mountains. The bees in Nagano-ken hardly know what summer is, but there is never a honey dearth from May to October. Queen rearing can be carried on successfully here. However the winter is very long in Nagano-ken, as well as in Hokkai-do.

In Taiwan (Formosa) and in Chosen (Korea) there are peculiar conditions in the beekeeping which I hope to tell you about later.

Honey Source.

The Genge (*Astragalus sinicus*) is the foremost honey plant in Japan and the principal honey flow comes from it during April and May for about six weeks. There is both an early and a late variety. Genge honey is light in color and of good flavor and the average beekeeper can harvest about 100 pounds of honey per colony from this source.

The Natane or rape (*Brassica chinensis*) is our earliest source of honey, occurring about February or March in the southern regions. The same plant is used for rape seed oil, and Genge is used for green manure in the rice fields. Rape honey is light yellow and of a disagreeable flavor and granulates rapidly. The Mikan or Japanese orange (*Citrus Aurantium*) and other oranges are planted in a few well adapted places and bloom about June. The Wakayama, Shizuoka, Gifu and Aichi kens

are famous for "Mikan" plantations. The Haze-no-ki (*Rhus Succedanea*) is plentiful in some parts of the country and blooms about June. The Hagi (*Lespedeza bicolor*) or bush-clover yields honey in some of the high mountains and blooms from August to September.

We also have buckwheat, which is the same plant as found in America. In fall, in Hokkai-do, the Naginata-kauzu plant (*Eriobotria Patrini*, Garcke) is an important honey source. The honey has a peppermint-like odor. This plant blooms in October. The Biwa (*Eriobotria Japonica*) blooms in December too late for the bees in average locations, although in some of the warmer regions honey is obtained from this source. We have many other bee plants which are not so valuable from the point of honey production.

Bee Diseases and Enemies of Bees

The Isle of Wight disease and American and European foulbrood have never yet appeared in Japan. We have the usual troubles, such as dysentery, etc. The Japanese hornet, or so-called Mandarin hornet, is the worst enemy with which we have to contend.

Tara, Gifu-ken.

IS THE HONEYBEE NATIVE OF AMERICA?

A Discourse Intended to Commemorate the Discovery of America by Christopher Columbus.

By Jeremy Belknap.

Delivered at the request of the Historical Society of Massachusetts on the 23rd of October, 1792.

Dissertation No. 3, on the question whether the honeybee is a native of America.

Mr. Jefferson, in his notes on Virginia, has said that "The honeybee is not a native of our continent. The Indians concur with us in the tradition that it was brought from Europe, but when and by whom we know not. The bees have generally extended themselves into the country, a little in advance of the white settlers. The Indians called them the white man's fly; and consider their approach as indicating the approach of the settlement of the whites." He allows that "in Brazil there is a species of honeybee, without a sting, but that it is very different from the one we have, which perfectly resembles that of Europe." The facts adduced by the respectable author are true; but they will not warrant his conclusion that "the honeybee, meaning the one resembling that of Europe, is not a native of our continent."

There is one circumstance in the history of Columbus, which proves that bees were known in the islands of the West Indies, at the time of his discovery. When on his first return to Europe he was in danger of perishing at sea, he wrote an account of his discovery on parchment, which he inclosed in a cake of wax, and put

into a tight cask, committing the whole to the sea, in hope of its being driven on shore or taken up. This was procured in the island of Hispaniola, which he had visited, and it was one of the first fruits of his discovery.

The indefatigable Purchas gives us an account of the revenues of the Empire of Mexico, before the arrival of the Spaniards, as described in its annals; which were pictures drawn on cotton cloth. Among other articles he exhibits the figures of covered pots with two handles, which are said to be pots of "bees' honey." Of these pots, two hundred are depicted in one tribute-roll, and one hundred in several others.

This account is confirmed by a late history of Mexico, written by the Abbe Clavigero, a native of Vera Cruz, who from a residence of thirty-six years in Mexico, and a minute inquiry into the natural history and antiquities of his country must be supposed to be well informed, and competent to give a just account. He tells us that a part of every useful production of nature or art was paid in tribute to the kings of Mexico; and among other articles of revenue he reckons "600 cups of honey" paid annually by the inhabitants of the southern part of the empire. He also says, "that though they extracted a great quantity of wax from the honeycomb, they either did not know how or were not at the pains to make lights of it."

In his enumeration of the insects of Mexico, he reckons six different kinds of bees which make honey, four of which have no stings, and of the other two which have stings, one "agrees with the common bee of Europe, not only in size, shape and color, but also in disposition and manners, and in the qualities of its honey and wax."

In the account given by Purchas, of the travels of Ferdinando de Soto, in Florida, it is observed that when he came to Chiaha, which by the description was one of the upper branches of the Mobile (now in the State of Georgia) he found among the provisions of the natives "a pot full of honie of bees." This was A. D. 1540, when there were no Europeans settled on the continent of America, but in Mexico and Peru.

From these authorities it is evident that honeybees were known in Mexico and the islands, before the arrival of the Europeans; and that they had extended as far northward as Florida, a country so denominated from the numberless flowers, which grow there in wild luxuriance and afford a plenty of food for this useful tribe of insects. The inference is, that bees were not imported by the Spaniards; for however fond they might be of honey as an article of food, or of wax to make tapers for common use, or for the illumination of their churches, yet as bees were known to be in the country there could be no need of importing them. The report of honey and wax being found in the islands, in Mexico, and in Florida, had reached Europe and had been published there long before any emigrations were

made to the northward; therefore, if these had been considered as articles of subsistence or of commerce, the sanguine spirit of the first adventurers would have rather led them to think of finding them in America, than of transporting bees from Europe to make them.

As to the circumstance of the bees "extending themselves a little in advance of the white settlers," it cannot be considered as a conclusive argument in favor of their having been first brought from Europe. It is well known that where land is cultivated, bees find a greater plenty of food than in the forest. The blossoms of fruit trees, of grasses and grain, particularly clover and buckwheat, afford them a rich and plentiful repast, and they are seen in vast numbers in our fields and orchards at the season of those blossoms. They therefore delight in the neighborhood of "the white settlers, and are able to increase in numbers, as well as to augment their quantity of stores, by availing themselves of the labors of man. May it not be from this circumstance that the Indians have given them the name of "the white man's fly"; and that they "consider their approach (or frequent appearance) as indicating the approach of the settlement of the whites?"

The first European settlement in Virginia was made about seventy years after the expedition of De Soto, in Florida, and the first settlement in New England was ten years posterior to that of Virginia. The large intermediate country was uncultivated for a long time afterward. The southern bees, therefore, could have no inducement to extend themselves very far to the northward for many years after the settlements were begun, and within that time bees were imported from Europe.

That honey and wax were not known to the Indians of New England is evident from this, that they had no words in their language for them. When Mr. Eliot translated the Bible into the Indian language, wherever these terms occurred he used the English words, though sometimes with an Indian termination.

Joffelyn, who visited New England first in 1638, and afterward in 1663, and wrote an account of his voyage with some sketches of natural history in 1673, speaks of the honeybee in these words: "The honeybees are carried over by the English, and thrive there exceedingly."

There is a tradition in New England that the person who first brought a hive of bees into the country was rewarded with a grant of land; but the person's name, or the place where the land lay, or by whom the grant was made, I have not been able to learn.

It appears then that the honeybee is a native of America, and that its productions were found by the first European visitors as far northward as Florida and Georgia. It is also true that bees were imported from Europe into New England, and probably into Virginia; but whether if this importation had not taken place, the bees of the southern parts would not have ex-

tended themselves northerly, or whether those which we now have are not a mixture of native and imported bees, cannot be determined. It is, however, certain that they have multiplied exceedingly, and that they are frequently found in New England, in a wild state, in the trunks of hollow trees, as far northward as cultivation and settlements have extended, which is nearly to the 45th degree of latitude.

I have made inquiry of several persons from Canada, but have not learned that bees were known during their residence in that country. It is, however, not improbable that as cultivation extends, the bees may find their way to the northward of the lakes and rivers of Canada, even though none should be transported thither by the inhabitants.

WAS THERE A NATIVE HONEY-BEE?

By Frank C. Pellett.

We are indebted to our good friend Harold L. Kelly, of Washington, D. C., for the above article written by Mr. Belknap in 1792. Mr. Kelly found this among some old writings on bees in the Library of Congress. Written, as it was, so long ago, it is of much historical interest, although not altogether convincing to one who is familiar with the bees of the tropics.

The first statement, to the effect that Columbus enclosed an account of his discovery in a cake of wax is not conclusive for the reason that the wax might easily have been obtained from the stingless bees.

The Mexican bees are said to be of six different kinds, of which four have no stings and the other two have stings. The stingless bees, of course, could not be mistaken for the honeybee. One of the stinging kind was very probably the honey-making wasp, which was described by the writer in this Journal in January, 1921.

Since the description which was supposed to refer to the honeybee was written long after the Spaniards had settled in Mexico it does not follow that it was a native species to which the writer referred.

The reference to the "pot full of honie of bees" found in what is now Georgia is more convincing, but even this might easily refer to the product of the bumblebee, which produces a small amount of honey. The natives were often attracted by food in small quantity and travelers finding them eating honey might mention the fact without calling attention to the source.

The fact that the honeybee extended its range so rapidly and in advance of settlement indicates that it was an introduced species. This is not absolute, however, since a change in conditions often affects the spread of a native species. The breaking up of the prairies caused the Colorado potato beetle, a native insect, to change its food plant from the buffalo burr to the potato, and then to spread all

over the continent. This change, however, came with the advance of settlement and not ahead of it. It is possible, of course, that there was a native honeybee confined to a limited area which remained in its original habitat and that it was the European species which did in fact spread over the country following its introduction.

There is a persistent opinion that the honeybee was native to America although no proof of the fact has as yet been brought forward. We are much interested in establishing the fact or definitely proving to the contrary and appreciate such information as the above which Mr. Kelly has found. Through his kindness we are able also to republish, for our readers, notes concerning bees in Mexico to which Mr. Belknap refers.

EXCERPT FROM THE HISTORY OF MEXICO

By Abbe D. Francesco Saverio Clavigero (1731-1787).

Translated from original Italian in 1806 by Chas Cullen, Esq.

Excerpt from Book 1, of Volume 1.

There are at least six different kinds of bees. The first is the same as the common bee of Europe, with which it agrees, not only in size, shape and color, but also in its disposition and manners, and in the qualities of its honey and wax.

The second species, which differs from the first only in having no sting, is the bee of Yucatan and Chiapa, which makes the fine, clear honey of *Estabentun*, of an aromatic flavor, superior to that of all other kinds of honey with which we are acquainted. The honey is taken from them six times a year, that is once in every other month; but the best is that which is got in November, being made from a white flower like *Jessamine*, which blooms in September, called in that country *Estabentun*, from which the honey has derived its name. The honey of *Estabentun* is in high estimation with the English and French, who touch at the ports of Yucatan; and I have known the French of Guarico to buy it sometimes for the purpose of sending it as a present to the king.

The third species resembles in its form, the winged ants, but is smaller than the common bee, and without a sting. This insect, which is peculiar to warm and temperate climates, forms nests, in size and shape resembling sugar loaves, and even sometimes greatly exceeding these in size, which are suspended from rocks, or from trees, and particularly from the oak. The populousness of these hives is much greater than those of the common bee. The nymphs of this bee, which are eatable, are white and round, like a pearl. The honey is of a greyish color, but of a fine flavor.

The fourth species is a yellow bee, smaller than the common one, but like it, furnished with a sting. Its honey is not equal to those already mentioned.

The fifth is a small bee furnished with a sting, which constructs hives of an orbicular form, in subterranean cavities; and the honey is sour and somewhat bitter.

The *Tlalpiprolli*, which is the sixth species, is black and yellow, of the size of the common bee, but has no sting.

Wasp

The *Xicotli* or *Xicote*, is a thick black wasp, with a yellow belly, which makes a very sweet honey, in holes made by it in walls. It is provided with a strong sting, which gives a very painful wound. The *Cuicalmiahautl* has likewise a sting, but whether it makes honey or not, we do not know.

SWARMING

By Jes Dalton.

Bees can get crowded for room just as easy in a garret, or barn, as they can in an 8-frame hive.

This is hardly realized by the uninitiated.

We read criticisms of the large hive based on something like this:

"I procured a large hive, and placed a large super on it and put my best queen and 8 combs in it, filled up all vacant space with full sheets of foundation, but they swarmed right during the flow without drawing over half of the foundation."

Owing to the natural broodnest being in shape of a sphere, and honey all stored around outside of this sphere, one must realize that it makes no difference if this honey-bound sphere is up in the corner of barn or in an 8-frame hive, the result, so far as a place for the queen to lay is the same, a lack of room. Putting a few sheets of foundation or even drawn combs on one side of this sphere is not giving room.

In Beekeepers' Item, Messrs. Stone and Joor, use such terms as "Fatigue theory," "Suppression of vitality," etc.

Isn't this a trifle like the blind men that went to see the elephant? One felt of his side and proclaimed him "very like a wall." Another got hold of his tail and thought he resembled a rope, etc.

Editor Demuth carries the impression that more than one queen in a colony or queen cells will cause swarming.

In my big cell-building colonies I always have two queens, and sometimes in addition as many as 50 cells in all stages, and once in a while a virgin will emerge in all this, yet I have never had one of these swarm with plenty of empty combs (egg laying space) in the brood chambers.

Oftentimes these colonies will have 25 to 30 frames filled with brood in all stages. I have seen, many times, two queens living peaceably in the same colony.

I have kept them that way with nothing between them for weeks, have seen them within an inch of each other on same comb, with no swarming.

I am under the impression that the

late Alexander kept as many as 14 altogether in one hive with no swarming.

Mr. Extracted Honey Producer, the cause of over 90 per cent of your natural (not freak) swarms is a lack of room in the broodnest. The cause of 90 per cent of your lack of room is trying to use too small a hive.

Your best remedy for swarming is a big hive, a young queen and a wide-open entrance. An extra fine dose of medicine (by far the best I ever tried) is 6 to 8 empty combs right in the center of brood nest. A whole super full of combs is also good.

Another point in having those swarms when they settle on an inaccessible location. A comb of brood held against the cluster and a little smoke applied to the lower part of it will usually drive them onto that comb, and you can carry them and put them where you like without lugging hives around to them. I keep a long pole handy and when they cluster in reach of that, I wire my comb onto the end of it and hold it against and above them for a few minutes. That solves some hiving difficulties.

A word of caution: If robbers are bad, be careful else you give them entrance and establish them inside the new colony with this comb and they will promptly clean it up and the swarm will likely abscond.

Louisiana.

SWARM CONTROL BY MANIPULATION

By W. E. Joor.

I read the article on the above subject by Mr. E. M. Cole in the May, 1922 Journal with a great deal of interest, and in a way I agree with him. He brings out some good points, but overlooks what I consider the real point of the subject. The real reason why the "temporary disturbance in the continuity of the emergence of brood" as given by Mr. Demuth, is successful and why the manipulations outlined by Mr. Cole are successful, is the removal of the very beginning of the tendency towards swarming. These all conform to the theory, which I hold, to which I have given the name of "Fatigue Theory." It is that due to a reduced vigor or vitality in the queen, caused by the strain of heavy egg-laying combined simultaneously with vitiation of the air resulting from congestion in the broodnest, faulty ventilation and heat, the nurse bees conclude the queen is failing. This reduced vitality shows in a slackening or cessation of egg-laying, and relaxed control of the broodnest by the queen and may be permanent if the queen be old, or only temporary, till she regains her vigor after a rest, if she be younger and have enough vitality to come back.

These cells proceed in their development until the queen regains her energy, when in endeavoring to re-assume her control of the combs and hive, she finds these cells which the young bees are fostering. Not being permitted by their guards to destroy

them, she becomes restless. This restlessness being transmitted to the old bees and many young ones who side with her causes uneasiness in the hive, brings on the swarming fever and results in a swarm.

The effect of manipulation resulting from the "Disturbance of Emergence" theory is the removal of brood from the broodnest and usually accompanied by new combs for a new broodnest, or perhaps foundation, as well as frequent removal of many young bees with the brood. This removes congestion, which automatically improves the air in the broodnest and reduces the heat, to which the young bees and brood contributed considerably. Note that if manipulation is delayed too long after the swarming mania is well under way and any brood to start new queen cells is left in the broodnest, which brood would either be accompanied by or will draw young bees, swarming may occur anyhow.

Dequeening and immediate requeening with a young laying queen after destroying all cells, Mr. Cole states, fixes that colony for the season. Dr. C. C. Miller does not agree to this result and states that he thinks it is sure only when the young queen is reared in that colony.

I think it would work if the young queen were introduced long enough before the swarming season so that she is thoroughly in control before the swarming season starts, otherwise not, as the bees will not give her complete control. E. W. Alexander considers that it takes thirty days for a queen to be fully at home.

Mr. Cole, however, is right in saying that keeping the hives queenless for ten days and then requeening with a young laying queen produces somewhat the same condition that prevails after swarming, and it is very nearly the same in result. It also produces the same results in later reducing the working force and lessening the crop if the flow lasts long enough. But if the beekeeper lets them get to the point of contracting the swarming fever, it is about as good as can be done.

Mr. Cole is also right and backed up by Dr. Miller in stating that any old queen given after 10 days of queenlessness will not always prevent later attempts at swarming. He also states, truly, that a long season will generally bring on this later attempt in this case.

Here we have additional proof of the "Fatigue Theory." If the old queen can stand the work to the end of the season there is no swarming, but if she cannot and lets up again, cells to replace her are again started which, if the season lasts long enough, will again produce the swarm. In other words, the cycle is repeated.

The young queen, however, can and does last even a long season without letting down, and so no swarms.

Mr. Cole is right when he says removing brood, etc., and other methods known as swarm prevention are based on the idea of delayed swarming. These, by relieving congestion

and accompanying heat and increasing the ventilation, remove the primary start, the building of queen cells towards swarming. However, he is on the wrong track in comparing these conditions to those of nature. In nature there is generally plenty of room, also the colony is in the shade generally, and has the thick walls of the tree trunk to protect it against outside influences. Besides how do we know but what bees in nature may swarm more than we want them to in domesticity?

Drastic treatment is required to stop swarming after the fever gets started. Mr. Scholl was right when he stated that the time to stop swarming was before it started.

After starting, queenlessness for ten days and destroying cells gives time for the desire to swarm to abate, if not reinforced by the jealousies of queens in cells (destroying the cells stops that) and change it to a desire for a queen. Requeening satisfies that desire and so no swarming until another queen lets down, which may occur if an old queen be given and the season lasts long enough.

I am a believer in development of what might be called a non-swarming strain, but as may be gathered above, not as it is ordinarily understood. An extremely vigorous strain of bees, with large vitality in the queen will be poor swarmers. The queen, being vigorous, will live longer and produce longer-lived bees. This will, as the bees are also vigorous, produce more honey. They will also winter better for the same reason and give maximum resistance to disease, though American foulbrood can get them, as it is no respecter of bees, or rather seems to pick on the best ones, for they are the ones most likely to rob out colonies destroyed or weakened by foulbrood. Therefore, let us develop the strongest and most vigorous queens and we will advance toward non-swarming.

Texas.

PLANTS WHICH REQUIRE ACID SOILS

By John H. Lovell

In my recent article on soils and nectar secretion it was pointed out that the influence of lime soils on the distribution of plants had been known for centuries, but that the effects of acid soils had been recognized only during the last half dozen years. A plant might survive in an acid soil, but in general it was supposed to be injurious to plant growth. The knowledge that many plants will succeed only in an acid soil is of the greatest value to the florist, the horticulturist, the beekeeper and to all who cultivate plants. Undoubtedly scores of attempts to grow our native herbs and shrubs have failed because the soil used was not suitable. It was not possible to cultivate the blueberry or the mayflower until it was known that they require an acid soil. Orchids, also, require an acid soil, and it is labor in vain to transplant them into a calcareous soil. But it is not sufficient that a soil be acid or

alkaline; there must be the right degree of acidity or alkalinity, for determining which with great accuracy there are now provided two well-established methods. Both in Europe and America investigators are giving much attention to the acid reactions of soils to plants. A brief review of some of the more interesting results should be of value.

In Maryland 1,500 soils have been tested; 75 showed very strong acidity; 150 strong acidity; 405 medium acidity; 270 were slightly acid; 210 were very slightly acid, and 390 were not acid. In my article it was shown that the soils of Pennsylvania were largely acid.

The soils in which 145 species of mosses were growing have been tested by Amann. Forty-three species thrived on acid soils; 53 on alkaline soils; 35 on neutral soils, and 14 were indifferent. The upper surface of a soil may be neutral and the under layers acid. Wind deposits or leaching may change the character of a soil over a small area.

In the case of 35 species of ferns Wherry found 5 growing in intensely acid soils; 5 in acid soils; 7 in lime soils, and 18 were indifferent. Among rock ferns certain species succeed best in calcareous soils, while others require acid soils. Ferns of the woods and swamps are less sensitive to acid and alkaline soils than those growing on the rocks.

The soils of the southern states are more generally acid than those of the northern section. Decomposition of the mineral elements is more rapid in the South; and, except where limestone outcrops, the lime has been leached out and the soils are inclined to be acid. In the North the glacial deposits still contain minerals, which as they decompose keep the soils calcareous or near neutral. But in New England, except in the limestone valleys, the soils are largely acid. This is shown by the blueberry barrens of southeastern Maine and the many heaths common on the hills; and in southeastern Massachusetts by the great swamps of sweet pepperbush and the abundance of the huckleberry and Mayflower on Cape Cod.

Wherry also tested the soils in which some 61 species of orchids were growing. Without exception, all the southern species grew best in acid or extremely acid soils. Many of the northern species favored circumneutral soils, or soils either slightly acid or slightly alkaline; but a part of them showed a preference for acid soils. These observations are most valuable to the orchid grower.

Practically all the members of the heath family, or *Ericaceae*, according to Wherry, are acid soil species. The soil reactions of 75 species and varieties were tested. This family contains a great many honey plants. Well-known species are sweet pepperbush, wintergreen, Indian pipe, *Rhododendron*, *Azalea*, mountain laurel (*Kalmia*), Labrador tea, Mayflower, fetterbush, boxberry, sourwood, *Andodendron*, *Azalea*, mountain laurel leberry, etc. In Europe the common heather (*Calluna vulgaris*) covers

immense areas. It will not grow on a calcareous soil. The plants make a weak growth and soon perish. The growth of this shrub is likewise dependent on a fungus which infects the roots. Not infrequently beekeepers seek to obtain the seeds of acid soil plants with the intention of sowing them on lime soil, but all such endeavors to improve the honey flora are a waste of effort.

Waldoboro, Maine.

QUEEN INTRODUCTION

By C. E. Fowler.

On page 19, middle column, of American Bee Journal for January, "The Nuclei Packages," reminds me of some packages (2 and 3-lbs.) I got two years ago from a prominent queen breeder. There was snow on the ground when they came, and I put them in the kitchen and in the morning I noticed one in which the queen cage hung an inch below the bees.

The bees were packed tight in top of cage, but the wire holding the cage was so long the cage was below cluster, and when I opened them I measured every wire and they were from 3 to 7 in.

The queen and bees in cage on short wire were very nice, but on long wire one queen was dead, another one every bee but the queen was dead.

Of course, when the bees were put in they filled the package, but when the air was cool they clustered in top and left the queen hanging below, and hot air does not fall down. I wrote to the queen breeder and he thanked me and said he had instructed his helpers to use short wires.

Every shipper of packages ought to read this and study it up and use short wires so the queen hangs in the cluster when the air is cool in transit toward the north pole.

The beekeeper who receives a weak queen might save her by using my safe system of queen introduction. Take a frame of emerging brood, brush bees off, cage it with wire, one-eighth-inch; open queen cage, put it on the frame and hang in center of brood.

From one to two bees will hatch every minute, and in 24 hours the queen will be in the midst of one-quarter pound of young bees and can lay an egg every time a bee emerges and get her 400 egg-laying machine in good working order, so when the nucleus (young bees) is released in the colony the bees won't be disgusted and supersede her, as they sometimes do, and the beekeeper never knows it unless the queen's wing was clipped. I once had five out of eleven queens superseded after they were apparently accepted.

By this plan the queen begins to lay quicker than most any other way and may have a pound or more extra bees when the honey flow is started.

(The above method is good, but it is not new. Dr. Miller gave it on page 254 of "Fifty Years Among the Bees," with the only difference that he used several combs of hatching brood, without screen or cage.—Editor.)

SAFE INTRODUCTION

By John Protheroe.

Most beekeepers are fond of telling you their own particular method of safe introduction. Here is mine: I have never bothered to confine an imported queen on a comb of emerging brood. In the hive into which I intend to introduce the queen I keep a queen cage with a dozen imprisoned bees. On the arrival of the foreigner I expel these bees and replace them with a dozen newly-hatched infants. I then release the new queen onto a window pane, insert her into

this cage, and replace in the hive in the same place as before, having smeared the cage with the corpse of the superseded queen. I have found this 100 per cent safe, even with queens that arrived, after a month's trip from Carniola, in a weak and daubed condition and scarcely able to fly. The young bees soon get strong enough to groom and feed the queen. I always destroy and burn attendant bees and cage. If there should be any infection it will be conveyed solely on the person of the queen; this infection passes at once into a strong, active colony, where it will probably be lost. Yes, I confess to the word "probably." Anyway, I consider this better than nucleus introduction.

The above method is based on the odor theory, of which I confess myself a strong supporter. The bees have become accustomed to the cage. The cage has become thoroughly impregnated with the hive odor. The infants are natives of the hive. The only foreign object is the strange queen. The smearing of the corpse of the late queen over the cage creates the usual curiosity. Some sentimentalists affect to see a manifestation of grief in the excitement of bees over any object against which the corpse of a queen has been crushed. I think this can safely be laughed out of court. Whether the emotion is grief or horror or just vulgar curiosity doesn't matter much; the useful point about it is that it is absolutely devoid of hostility. The angry cluster aroused by placing a strange cage with a strange queen and strange bees into a hive is never started up; it is this attitude of hostility that causes failure.

Virginia.

SUPERVISION OF QUEEN BREEDERS

By M. G. Ward.

The fact that there is dissatisfaction with certain shippers of queens, indicates that something must be wrong. In the March issue of the American Bee Journal there are about 75 advertisements. No one after taking thought could expect that every one of them could be depended upon to make a satisfactory showing in quality and service. If the queen breeders are falling short of what the buyers have the right to expect it is serious for the competent ones, for if dissatisfaction becomes general it will hurt the good producers as well as the others. I feel quite sure that the majority of beemen would be glad if they could know where dependable queens could be purchased. I am sure more queens would be bought if none but good queens were sent out. This is a reasonable desire on the part of the beemen—and I feel that they are entitled to just such information—but how can matters be arranged so this information can be had? It would simplify matters very much if one could make application at some reliable "clearing house" and receive the desired information.

It soon becomes apparent that

TENNESSEE-BRED QUEENS

Fifty-one Years' Experience in Queen-Rearing
Breed Three-Band Italians Only

	Nov. 1 to June 1			June 1 to July 1			July 1 to Nov. 1		
	1	6	12	1	6	12	1	6	12
Untested.....	\$2 00	\$ 8 50	\$15 00	\$1 50	\$ 7 50	\$13 50	\$1 25	\$ 6 50	\$11 50
Select Untested.....	2 25	9 50	18 00	1 75	9 00	16 00	1 50	7 50	13 50
Tested.....	3 00	16 50	30 00	2 50	12 00	22 00	2 00	10 50	18 50
Select Tested.....	3 50	19 50	35 00	3 00	16 50	30 00	2 75	15 00	27 00

Select tested, for breeding, \$7.50.

The very best queen, tested for breeding, \$15.

Capacity of yard, 6,000. I sell no bees by the pound or nuclei, except with high-priced tested and breeding queens.

Queens for export will be carefully packed in long-distance cages, but safe delivery is not guaranteed.

JOHN M. DAVIS, Spring Hill, Tenn.

many things will have to be learned before such an institution can function profitably. To sort out and expose dishonest shippers would be the easiest duty that such an institution would need to perform. It means something to produce A-1 queen bees. It is lamentable that one's knowledge of queen rearing cannot be determined by his advertisements. Knowledge and training are absolutely necessary. Years of experience are required before one is qualified to rear queens commercially. After years of experience in queen rearing you generally find modesty in advertising.

I am for any plan that will raise the general standard of the business. I would like to see conditions such that when one sent money in response to an ad that he could be reasonably sure of what he was going to receive. The whole matter depends on the honesty and ability of the producer and shipper. The art of the business cannot be fully taught, one has to learn from experience. A multitude of things must be attended to on time, in the production of good queens. Any break in the line may cause a worthless one. Proper conditions must be provided all through the cell life of the queen bee. I have

seen A-1 virgins fail to mature into good queens from improper conditions in the nuclei. As Mr. Latham explains in the March issue, the feed in the cage must be right and the escort bees of proper age or the queen can be ruined in transit. When she reaches her destination, the buyer has his duty to perform. Queens can be made worthless by improper introduction. If such an institution as has been proposed could get rightly started I see great possibilities in sight.

California.

(Editor's Note: All advertisers are required to furnish bank references as to their financial responsibility and to furnish proof of their ability and experience before admission to the advertising columns of the American Bee Journal. However there are many details which are beyond the ability of a publication to reach. One breeder may furnish far better queens than another who can furnish equally good business references. If the queen breeders can formulate some plan which will set a high standard which must be met by every member of the organization it will do much to improve the quality of queens sold and help to

eliminate the breeder with insufficient experience.)

Another Patented Beehive

We just have copy of patent applied for by a party in Kansas for another beehive.

This is a cylindrical hive made in the shape of the old-fashioned log and with frames inside approximating this shape.

The hive, as suggested, is very ingeniously gotten up, but we question whether it will ever find great favor with the beekeepers, from the fact that it will be difficult to manufacture and difficult to manipulate.

A New Honey Booklet

Those interested in honey booklets to help in advertising and to increase the orders for honey, will find much of value in the one prepared for distribution by the Maryland State Beekeepers' Association. It is a small 8-page folder, containing general facts about honey, relating both to its production and its food value. It is tastily printed with colored ink on tinted stock. Copies may be had by addressing E. N. Cory, University of Maryland, College Park, Maryland.

You can have cash for your wax and old combs or cappings at the market price, or we allow a little more in exchange for supplies

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"falcon" Supplies, Queens, Foundation

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THE EDITOR'S ANSWERS

When stamp is enclosed, the editor will answer questions by mail. Since we have far more questions than we can print in the space available, several months sometimes elapse before answers appear.

INCREASE

I bought two 3-frame nuclei last summer; they did well and were good strong swarms last fall. I would like to increase as fast as possible. Would it be all right to take out some of the frames with brood next summer and put in new hives with full sheets of foundation and give them a queen?

MICHIGAN.

Answer.—Yes, you may make increase in that way. But in order to be still more sure, put brood combs in a new hive on the stand of a good average colony from which you have taken nothing, placing this colony in a new spot. In this way you can make one increase out of two old colonies and it will very soon be as strong as either of them, for the hive is strong in field bees at once. There are many ways of making increase and they are all good, provided you do not give a queenless colony empty frames to fill with combs; for a queenless colony always builds drone combs.

SWARM CONTROL

For the last two years I have tried the following method to control swarming of bees:

About the first week in May I added to the regular brood chamber a standard hive body and allowed queen access to both bodies.

Shortly before main honey flow, I drove queen and most of bees into lower body, added plenty of supers, and made this the regular colony. The upper hive body with brood and a number of bees I removed to a place in the bee yard and waited for young bees to emerge. These I used to strengthen the other colonies in the apiary.

The plan worked quite well. There was hardly any swarming, and I had big and active colonies. I had, however, considerable trouble with hive bodies which I had put back in bee yard to let brood come out. In spite of care taken to prevent it, the moths got in and did considerable damage. Quite a number of combs were destroyed.

This year I am at a loss what to do. Do you know of a way how to fight moths suc-

cessfully? I would gladly follow it? Have you any other suggestion for me? How would the following arrangement of parts work: 1. Regular brood chamber with queen. 2. Supers for comb honey. 3. Hive body with brood. This should secure protection against moths.

IOWA.

Answer.—The only way to fight moths is to keep your colonies strong. When you remove the hive body, you probably do not leave enough bees, and the moths have a good chance.

The method you suggest is the Demaree method and will work well with extracted honey production. When producing comb honey, the bees that bring pollen up to the upper story for the brood are likely to leave some of it in the supers, and that looks bad, and is bad, for comb honey.

Another very good way would be to put the hive of brood on the stand of another colony, not of the strongest, and put that colony in a new spot. This would do away with the danger of moths, provided you make sure that each colony has reared a queen, about three week later. Those that have not succeeded should be given a queen.

SWARM CONTROL

I intend to use the Demaree method as a swarm preventive with a few colonies this year. I intend to put the old queen and bees on full sheets of foundation in the old brood-nest, then a queen excluder, then three or four section honey supers with full starters, then a honey board with a bee escape, then the hive with the old brood.

My theory with the bee escape is after the young bees go below they cannot get back to the old broodnest to store honey, as I intend to use the old combs for new swarms when all or nearly all of the brood hatches. I have never used the Demaree method, so would like to hear what you have to say.

WISCONSIN.

Answer.—The method you propose is good, provided you do not turn the bees out

of that upper broodnest too soon. Enough of them must remain there to take care of the growing brood, and I would suggest that you do not put on the honey board with bee escape until about 10 days after making the exchange, so that the larvae, which will be growing during that time, may be fed with a supply of both pollen and honey. After they are sealed over, it will be all right to keep the bees from coming back to the brood-nest above, if the weather is fairly warm.

The number of supers to be used above the lower hive must be proportionate to the strength of the colony and the honey prospect.

(One drawn comb or one frame of brood should be left with queen in lower hive body when using this method.—F. C. P.)

MAY DISEASE

I have two colonies of bees out of 40 that have something wrong with them. There is a big pile of dead bees on the ground in front of each hive, some of the bees bring out dead ones and others come out and fall on the ground and crawl around like they have the blind staggers, then die. I notice that in both hives there is a little bluish-black bee that the other bees are fighting; both hives seem to be fairly strong and good workers. Please advise if there is any remedy. These hives both have supers full of comb but are light in weight.

LOUISIANA.

Answer.—The disease to which you refer is what they call in Europe "May disease," because it generally begins in May. It appears to be universal, never very dangerous, and sometimes recurring only one year in ten, or about. It is quite similar to the Isle of Wight disease, but it rarely kills the colony. It has been noticed in all of the United States, from Maine to California and from Washington to Florida. It seemingly is worst in damp spring seasons, but sometimes appears to be contagious. In this country it is usually called "paralysis."

As to the cause of the disease, nothing is positively known yet. It was ascribed to the *Nosema apis* until the *Nosema* was found in healthy colonies. But when colonies are suffering from any cause, the *Nosema* undoubtedly weakens them.

A beekeeper of former days, O. O. Poppleton, of Florida, claimed to have cured the disease by sprinkling powdered sulphur in the hive. It seemed to us, when we tried it, that the sulphur simply killed the sickly bees, leaving only the healthy. So we did not approve of it. In the Province of Ancona, Italy, where this disease did considerable damage some twenty years ago, they claimed to have cured it by feeding the bees with honey mixed with a syrup of spices, such as lavender, ginger, rosemary, etc., to act upon them as a tonic.

I suggest that you add a quart or so of young bees and a frame of brood to these colonies from healthy colonies of your apiary.

I also suggest that you mail about 50 or 100 workers from those hives, in a box with sugar candy, addressed to Bureau of Entomology, Washington, D. C., marking your name on the package. Some day our scientists will discover the trouble, which may be caused by a similar parasite to the *Tarsonemus* which is said to cause Isle of Wight disease. We rarely hear of that disease in your section. The cause is evidently widely scattered; but circumstances of moisture and unpleasant weather appear to initiate its course.

The little shiny black bees which you mention I believe to be bees which have overcome the disease but have been left in

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MINNEAPOLIS, MINN.

such shape that their presence is objectionable to the bees of the colony and they appear to treat them as robbers or strangers.

DRONES—HIVES

I have six colonies of bees; they are not very large, dark colored and three yellow rings around the body.

1. Can you tell me what kind of bees they are?

2. They seem to have a large number of drones. I have heard that these drones should be done away with, if so please advise me how and when.

3. I have nothing but 8-frame dovetailed hives; if these are too small to keep bees from swarming, would it be a good idea to take another hive body and put it on top of the old hive, or would this be too large.

4. If the bees swarm and you want to put them in the same hive from which they swarmed, must the queen be killed and must the queen cells be cut out?

MINNESOTA.

Answers.—1. Those bees are probably pure Italians. The three yellow rings are a very good sign of purity if they are uniformly marked.

2. Drones, when hatched, cost but little to keep. It would hardly pay to get rid of them, but you should examine your hive and take out the drone comb, replacing it with worker foundation. If you did not do

that, they would be sure to build drone comb again on the same spot. We always have more drones than we need.

3. Yes, it will be a good plan to double the size of your hive by using another story in the early part of the season, until the honey crop begins. Then remove one of the stories, leaving all the best brood combs in one hive and give the others to colonies that are not strong enough. Then put on plenty of supers for comb honey.

4. If the bees swarm, it is usually poor policy to put the swarm back, as it will not cure them of the swarming fever, even if you destroy the queen cells. But you should not kill the queen in any case, unless she is old and needs to be superseded.

TRANSFERRING—SWARMING

1. I want to transfer a colony of bees. The combs in the old hive are in such shape as to be worthless, but they are filled with brood in all stages. I don't want to lose the brood. How would it be to smoke the bees into the new hive and then place the old hive on top of the new hive with an excluder between them and leave them so for two or three weeks, or until the brood has left the cells? Would the bees, or part of them, remain in the lower, or new hive, with the queen, or would she be deserted? Would they begin drawing out the foundation or would they direct their attention entirely to the old hives?

2. I have always been fairly successful in

introducing queens by the smoke method. How would it do to brush, say a pint of bees, in a quart glass fruit jar, place the new queen among them, dampen them slightly, let them remain in the jar for 20 minutes or more, shaking them frequently? Would the queen take on the smell of the bees and be acceptable after being turned loose in the hive?

3. What do you think of putting Carniolan bees in Modified Dadant hives? Are they more prolific and better hustlers than the Italians?

4. When bees are superseding the old queens, do they build just one queen cell, or more?

5. Do bees swarm as many times as they have queen cells? My idea has been that if bees built five or six queen cells, they would swarm the same number of times.

MISSOURI.

Answers.—1. The method you propose is good if the colony is very populous. If there are bees enough they will take care of both the old brood above and the new brood of the queen. But if they are not sufficiently populous, it is better to transfer that brood by the method given in textbooks. See the "Hive & Honeybee," paragraphs 574 to 581, or "First Lessons" paragraph 94.

2. Have never tried the method you suggest. It would probably be successful in a good honey season. Bees are always more peaceable when they harvest honey.

3. Carniolan bees are certainly prolific. We have a number of reports of their filling all of the Dadant frames in a hive with brood at one time. The Italians are prolific, also.

4. Whether bees supersede their queen or prepare to swarm, they always, or nearly always, build a number of queen cells, sometimes 20 or more. When the first queen hatches, she kills all the other queens in their cradles, unless the bees prevent her, if they want to swarm again.

5. It is a mistake to think that bees build just enough queen cells for the swarms they want to cast. I doubt whether any bees in the hive have the desire of swarming more than once, until after the first swarm is cast.

PAINTING HIVES

I would like to know your advice on painting a hive with the bees in it. I recently purchased a hive containing bees. It needs painting badly. If it is advisable to paint them, what would be the best kind of paint to use and what time of day should the painting be done? ILLINOIS.

Answer.—A hive with the bees in it may be painted, if you do not paint around the entrance so that the bees get daubed with paint. But that is hardly the proper way to paint a hive, for the parts that need painting the most are the parts that you cannot reach when the bees are in it. I have painted hundreds, and perhaps thousands, of hives, in my young days, old hives as well as new ones. I found out that the part that rots first is the under edge of the hive and the edge of the bottom board, where the one rests on the other. If the hive is empty, I not only paint it on the face, but also on the lower edge. Same with the bottom board. When they are dry I transfer the bees back into them. I used ordinary white lead, slightly colored with different shades. Some people imagine that bees do not distinguish colors, but that is a mistake. They do.

I would advise you to buy an empty hive, paint it, then transfer your bees into it and paint the one they are now in, and do it right. It will pay and you can use the hive to put in the first swarm you get.

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JOHN W. CASH, Bogart, Ga.

DIVISION

1. Is it a good way to divide bees by removing four frames of brood containing larvae less than three days old, putting them into an empty hive, brush off all the bees into the old hive, put the new hive where the old hive stood and put the old hive at some other place?

2. In using a double brood chamber will the queen go from one story to the other?

PENNSYLVANIA.

Answers.—1. It would be still better if you leave many of the young bees on the combs which you remove, for the hive will need nurses and the field bees are not very good nurses. By doing the way you say it would deprive this new colony of all nurses. However, if you gave it a lot of hatching brood, it would not be so bad. You can do still better, if you have more than one colony to take from, by placing the swarm just made, on the stand of a second colony, leaving the old colony on its stand.

Still better would be to give the new colony a queen purchased previously, or a queen cell reared previously; but if you do not protect that queen cell you must give it to them only 24 hours after making the division, when they know they are queenless.

2. Yes, the queen goes into the upper chamber if she has no more room to lay below, or if her bees occupy that chamber and keep it warm, and it is more accessible than the side combs in the lower story.

BEES IN ORCHARD

A friend of mine who has an orchard of about 80 acres has asked me to place my bees in it for the benefit of the fruit bloom. How many strong hives would it require to work this orchard, as there are no other bees to amount to anything within three miles of the orchard?

ILLINOIS.

Answer.—This is guess work, as we have never made any positive experiments upon the question. Besides, the bees will not work solely in the orchard in which they will be placed, but will scatter more or less over a mile or so in every direction. Of course, the trees in the close vicinity will have the best chance for the fertilization of their blossoms.

I believe that a couple of dozen colonies would be ample for the fertilization of the blossoms, both in that orchard and smaller neighboring orchards in the vicinity. Much depends upon the season, as bees, in a fine day can cover a large amount of territory. But if we have only accidental or occasional clear and warm days, the blossom fertilization will not be so perfect. However, that is a matter which we cannot remedy.

The people who produce oranges and grapes in Florida have great faith in the work of the bees if they are in short range. While in Florida, I visited, at Manatee, one of the largest grape fruit orchards in Florida, the Atwood Ranch. They had two apiaries and paid the apiarist for keeping them there. They had the finest crop of grape fruit I ever saw.

MORE ROOM

1. I am interested in the idea of increasing the brood chamber of the few colonies of bees that I have, in order to decrease swarming and secure a larger surplus of comb honey.

My hives are 10-frame standard. I have no hives with frames of empty comb and would like to ask if I could place a hive body with full sheets of comb foundation over the present brood chamber and get any reasonably satisfactory results.

2. I am a raw amateur, as you no doubt easily guess, but I need your advice. When

I put on the section supers I understand that I must then remove the upper hive body and leave only the lower brood chamber. What will I do with the brood chamber that I have removed? It will contain brood, bees, honey and perhaps the queen.

CONNECTICUT.

Answers.—1. It is important that you should ascertain that your queens are prolific enough to fill more than one brood story previous to the honey crop. The objection we have to using two ten-frame bodies is that the 20 frames are altogether too large for the most prolific queens. We found, by experiment, that a half-story super made just about an ideal additional breeding room for a queen that can fill more than a single story of ten frames. But you can use foundation, if it is given early enough and the colonies are strong enough. A very good way would be to take some of the brood combs from colonies that would not be strong enough to need another brood chamber and use those in the double ten-frame hives, giving those medium colonies a part of the foundation to work out. In that way, you would enrich the strongest colonies at the expense of the others, but they would make a much better showing in honey production.

2. When you remove the additional hive body, to put on supers, you must do as Dr. Miller did, remove only the poorest brood combs, leaving all the bees and the queen and all the best brood combs with the hive from which you expect a large yield. The extra brood combs may be used in making increase or in helping the weaker colonies. Those colonies, coming later, would be good for making increase for extracted honey production. There is a lot of work in all that, but it pays.

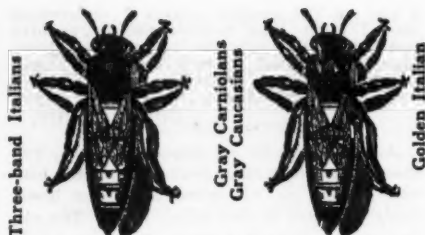
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IN THE PATH OF THE BEE

By Major Shallard

How many beekeepers realize how dependent the world is upon the bee for its food. I had an object lesson on this subject lately which I think could be beneficially passed on. At my house on the Bee Mountains we have plenty of fruit and plenty of vegetables and lots of bees.

The Canadian wonder beans are sure croppers and the tomato vines break down with the weight of the fruit. Do not forget there are thousands of bees. Now move (in your mind) to my home in Sydney, a city of a million inhabitants. We try to grow our vegetables but the beans do not bear and the tomato vines, although they grow well, fail to fruit.

What is the trouble? I could not understand it until I thought of the bees. No bees, no beans, no tomatoes.

A week or two back I saw a bee, one solitary bee, and I called the family to watch the little fellow. She worked right down one end of the tomato bed and then departed. Her track was very definable. and I watched very closely and where she went we have tomatoes on the vines today. Few people really comprehend the value of the bee to the world at large, independent of its honey production.

The above experience opened my eyes. If the city dwellers knew how the bees help their gardening efforts they would welcome their presence.

SOURCES OF HONEY IN BRITISH COLUMBIA

By W. J. Sheppard

The sources of honey vary to some extent in British Columbia, owing to the differences in climate, and to the variations in precipitation. On the lower mainland, in the wet belt, maples grow luxuriantly, and can be relied on to yield an early surplus, but alsike and white clover sometimes fail to secrete nectar freely. On the other hand fireweed, as a rule, gives a bumper crop. Cultivated raspberries add largely to the honey crop in some districts. The woolly Labrador tea (*Ledum groenlandicum*), which grows profusely on some of the low-lying peaty land in the Fraser Valley, and Salal (*Gaultheria shallon*) are claimed to be nectar-yielding. Here there is also the cascara tree (*Rhamnus purshiana*) from which the bees obtain nectar in the spring, during the building up season.

In the irrigated section of the Okanagan, in the dry belt, alfalfa contributes to the surplus, as also does the hairy vetch (*Vicia hirsute*), which is grown as a cover crop in the orchards. In the Shuswap and Thompson Valleys, alfalfa and sweet clover give good returns. Both the yellow-flowered sweet clover and the white have become naturalized, and grow wild here in some localities.

In the West Kootenay white and alsike clovers are depended on for a honey crop, in addition to which there is the spreading dogbane (*Apo-*

cynum androsaemifolium) commonly known as milkweed, yielding abundant nectar. There are also the fireweed (*Epilobium angustifolium*), snowberry bush (*Symphoricarpos racemosus*), and wild and cultivated raspberries.

In East Kootenay, the oleaster, or silverberry (*Elaeagnus argentea*) bearing small, fragrant, pale yellow flowers, is very common, and is said to be a nectar-bearing shrub. The wolfberry, another variety of the snowberry (*Symphoricarpos occidentalis*), which is also common in East Kootenay, yields nectar freely.

On Vancouver Island, the handsome madrona tree (*Arbutus Menziesii*) is reputed to be nectar-bearing.

The common dandelion (*Taraxicum officinale*) originally introduced into British Columbia, has become quite a weed, and sometimes yields an early surplus in various sections of the Province.

White Dutch clover (*Trifolium repens*), also originally introduced, is found growing almost everywhere, and has become one of the most important honey plants. Alsike clover (*Trifolium hybridum*) grows wild in many places, where the soil is sufficiently moist to support it.

Principal Nectar-Bearing Native Flora of British Columbia

Barberry (Oregon grape) (*Berberis aquifolium* and *Berberis repens*).

Bearberry (Kinnikinnik) (*Arctostaphylos Uva-ursi*).

Bird cherry (*Prunus pennsylvanica*).

Blueberry (*Vaccinium ovalifolium*).

Canada thistle (*Cirsium arvense*).

Cascara (*Rhamnus purshiana*).

Choke cherry (*Prunus demissa*).

Crab apple (*Pyrus malus*).

Fireweed, or great willow herb (*Epilobium angustifolium*).

Goldenrod (*Solidago canadensis*).

Huckleberry (*Gaylussacia resinosa*).

Labrador tea (*Ledum groenlandicum*).

Maples.

Oleaster (silverberry) (*Elaeagnus argentea*).

Raspberry (red) (*Rubus occidentalis*).

Salal (*Gaultheria shallon*).

Snowberry (*Symphoricarpos racemosus*).

Spreading dogbane (Milkweed) (*Apocynum androsaemifolium*).

Wolfberry (*Symphoricarpos occidentalis*).

Nelson, B. C.

Illinois Associations

The Illinois counties are gradually organizing into local associations. This is a step towards co-operation which may bring it about more promptly. Logan County organized at Lincoln, on March 28, through the management of the County Agent, Mr. J. H. Checkley. The officers are: President, S. A. Tyler, Emden; Vice President, Louis A. Mann; Secretary, Fred F. Ballati, Mount Pulaski. There is to be a field meet arranged by the Executive Committee.

A Marketing Suggestion

To start with, let me say that I believe in co-operation, but not in the way designed for most of the co-operative ventures proposed in the recent past. Where producers, whose interests are identical and whose cost and problems are similar, band themselves together with a competent business manager, success may be expected. The Colorado Honey Producers' Association is an example of the kind of co-operative organization that is likely to succeed. Colorado is mentioned because it is the oldest among beekeepers. The Texas organization seems to be doing well, also.

Nation-wide organization for buying, selling or advertising is bound to fail. The beekeeper living near the best markets in New York State can hardly be expected to combine forces with the man in California, who must ship his product across the continent and sell in the same market.

It looks reasonable that any group of beekeepers whose product is similar in quality may readily establish a market for their product through the trade channels by means of a little judicious advertising. It has been done many times with other products, why not with honey? Any of the large cities, New York, Chicago, Boston, Pittsburg or Baltimore, can be made to consume a surprising amount of honey by means of well directed effort. Instead of talking about a nation-wide advertising campaign when there is no system of distribution by means of which the resulting demand can be supplied, why not take the city of Baltimore and cover it thoroughly. Use the newspapers and window displays in the best stores to call attention to the product of the hive. See that every store in town has honey on the shelves, and send a corps of solicitors through the city to take orders to be delivered by the store with whom the customer regularly trades. In a month's time a demand can be established which will last for years. Later take another city in the same way. The people will buy the honey if it is called to their attention.—F. C. P.

Bee Culture in British Columbia

The Department of Agriculture of British Columbia has recently issued a new bulletin of 60 pages entitled "Bee Culture in British Columbia. It is written by W. J. Sheppard, Provincial Apiarist, and A. W. Finlay and J. F. Roberts, assistants. Much interesting information concerning conditions in British Columbia is included. It is stated that the honey crop was estimated at 20 tons for the province at the time of the passage of the first foulbrood act, while last year's crop was estimated at 355 tons, showing a very large increase. Considerable space is given over to consideration of the honey plants of the region. The numerous illustrations add much to the attraction of the bulletin. Those interested should address W. J. Sheppard, Provincial Apiarist, Nelson, B. C.

BEEKEEPERS WE MANUFACTURE DOVETAILED HIVES, HOFFMAN FRAMES, SECTIONS AND SHIPPING CASES

Our hives are made of best grade White Pine, cut accurate and smooth to standard measure. Sections are made of Basswood polished on both sides. There are no better made.

We carry a complete line of everything used in the apiary. Our shipping facilities are as good as can be found anywhere. We want your business. We guarantee prompt and satisfactory service. Price list free.

MARSHFIELD MANUFACTURING COMPANY, Marshfield, Wis.

3 BANDED

YOU LUCKY?

GOLDENS

You may be, if yours is one of the 15th orders we receive, for to every 15th order we have a pleasant "SURPRISE." Will you be pleased? We think so, both with our queens and your lucky "SURPRISE." Now ready to ship. Safe arrival and satisfaction guaranteed in United States and Canada. Wings clipped free on request. Prices, queens, untested, \$1 each; sel. untested, \$1.25 each; sel. tested, \$2 each; virgins, 50c each. Special package bees shipped from Louisiana. Two-pound package with queen and frame hatching brood, \$5; 3-lb. package, \$5.75. Nuclei, write for prices.

Ohio Valley Bee Co., Catlettsburg, Ky.

ITALIAN QUEENS—Three Banded and Goldens

After rearing queens in a commercial way for 12 years, and on a large scale, we believe we can offer as good queens as can be had. Our breeder has reared over 110,000 queens, and beekeepers who wanted good stock have bought them and got good results from them.

We use only the best breeding stock, and use only the best methods in rearing our queens. Send us your order and get good value for your money. Everything we sell must please or we refund your money.

PRICES OF QUEENS:

Untested Queens:		Tested Queens:	
1 Queen	\$ 1.00	1 Queen	\$ 1.50
12 Queens	10.00	12 Queens	17.00
100 Queens	75.00	Good Breeders, each	5.00
1000 Queens	700.00		

Golden Queens are reared five miles from other queen yard. Let us fill your order. We are mailing Queens promptly.

THE CITRONELLE APIARIES, Citronelle, Alabama

MACK'S 3-BAND ITALIANS

Are now building hundreds of the very finest queen cells. We are being kept so busy rearing and mailing queens that we haven't time to write a big ad this month. We want you to place our queens alongside any queens you may buy on the market, regardless of price, breed or color, and note their superiority. Every queen guaranteed to reach you in good condition, to be purely mated and to give what you think is satisfaction. Have never had any infectious or contagious disease in our apiaries. For more information send for free catalog.

PRICES

	1 to 49	50 to 99	100 up
Untested, each	\$1.00	\$.95	\$.90
Select untested, each	1.25	1.20	1.15
Select tested, each	2.00	1.85	1.75

HERMAN McCONNELL, Robinson, Illinois

FOR SALE

209 colonies of bees in ten-frame Langstroth hives in good condition; guaranteed free from disease; complete equipment for handling over 300 swarms; new honey house 20x30; also eight-room bungalow, with modern improvements, and six acres of land with 105 bearing apple trees sixteen years old, located in village of Custer. Good market and lake transportation. Owner moving to St. Louis, Mo. Price right. If interested, write for further particulars.

W. G. STEVENS, CUSTER, MICHIGAN

Examinations of Adult Bees for Diseases

During the coming summer the Bee Culture Laboratory of the Bureau of Entomology desires again to make examinations of adult bees which show any abnormality or evidence of disease. Beekeepers who notice any such cases among their bees are requested to send in material for examination. Samples of adult bees should be sent in a wooden box, not in tin. On request, a box will be sent with a frank for mailing. Each sample should contain at least 50 bees. Samples should be addressed to Bee Culture, Bureau of Entomology, Washington, D. C.

BEES — ITALIAN BEES — BEES

Full colonies with Italian queen at \$15.00 3 for \$30.00.

3-frame nucleus with Italian queen at \$6.00.

3-lb. package with Italian queen at \$5.50, 5 at \$5.00.

No disease. Safe arrival and satisfaction guaranteed. Van's Honey Farms, Van Wyngarden Bros., Props., Hebron, and

INDIANOLA APIARY CO.

Italian bees and queens delivered as follows:

1-lb. package with untested queen	-----	\$3.25
2-lb. package with untested queen	-----	5.25
3-lb. package with untested queen	-----	6.25
Untested queens, each	-----	1.00
Tested queens, each	-----	1.50

Satisfaction guaranteed. Prompt service a specialty.

J. W. SHERMAN, Indianola Apiary Co.
Valdosta, Georgia.

Few Packages for June at Reduced Prices

With queen introduced and laying enroute.

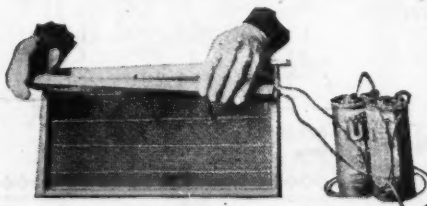
JES DALTON
Bordelonville, La.

A SPECIAL BARGAIN

A two-frame nucleus and queen.

Pure Italians at \$5 each.
Queens at \$1 each.

O. E. TIMM
Bennington, Neb.



ELECTRIC IMBEDDER

Price without Batteries, \$1.00

Not Postpaid.
Weight 1 lb.

Actually cements wires in the foundation. Will work with dry cells or with city current in connection with transformer. Best device of its kind on the market.

Dadant & Sons, HAMILTON, ILL.

HONEY MARKET CONDITIONS IN COLUMBIA—THE VANCOUVER CURB MARKET

By Bevan L. Hugh.

About a year ago the city council of Vancouver, B. C., instituted a curb market on a down-town street close to the business section of the city for the purpose of getting the producer and consumer into closer touch with each other. The market was found to be such a success from the start that additions had to be made from time to time, so that at the present time the market extends for a block on both sides of the street. The market is less than a block away from the city hall, public library and other prominent places and is also close to the interurban depot. The market is conducted daily except Sunday and from it are sold many products from the farm, including honey, eggs, dressed poultry, cream, butter, cheese, vegetables, fruit and fresh meat. Since the inception of the market many tons of honey have been sold direct to the public and from present appearances this promises to be a perpetual outlet for a large quantity of the product of the apiary.

The city officials encourage the farmers to cut prices as low as possible in order to allow city residents to benefit from the cheap, fresh produce.

In some respects this is all right, while in others it is all wrong. The year 1922 was a bumper one in B. C. for beekeepers and much honey was reaped, and as a result many became frantic from fear of not being able to dispose of all their honey, with the result that honey was dumped with a depressing effect on the market. In a country like this such a procedure is nothing more than pure foolishness for we have never yet been able to produce all the honey that could be consumed in the province. Last fall several men were on the curb market selling direct to consumers at 20 cents a pound, while at the same time others were endeavoring to dicker with wholesalers to purchase their crops at the same figure. I notice in recent reports issued by the chief inspector that British Columbia has a certain crop of honey valued at 25 cents per pound, wholesale. I wonder who was so fortunate as to receive such a price. I visited a large wholesaler and importer in Vancouver to find what honey was bringing and he told me there were so many different prices in British Columbia that they (the wholesalers) were not buying any more honey until the various beekeepers got together and decided on one price, below which no one would sell in an endeavor to beat the wholesaler.

An instance was brought to my attention of a beekeeper dumping several tons of unripe honey in order to get a larger crop. One beekeeper sold his honey for 14 cents wholesale. This does not look like 25 cents. Had beekeepers gotten together at the time the crop began to assume large proportions and decided on a reason-

able price there would have been no frantic unloading to the consumers at prices that were really wholesale. Such a procedure is unfair alike to producer and wholesaler and in the future the beekeeper who figures his crop in tons will have difficulty in making a deal with wholesale houses. There are two beekeepers' organizations in this province, both with branches throughout British Columbia. Bitter rivalry has been their motto instead of co-operation, with the result that some beekeepers have dropped out of both. What does the public want to know about fights in the ranks of a class of producers? One thing is certain, beekeepers reap no benefit by such doings, but the consumer generally does. Some of the beekeepers do not realize that when they boost honey they are advertising everybody's honey and helping to clean up the whole market and causing more people to eat more honey, with a beneficial effect to the whole fraternity.

The curb market in Vancouver can be made a valuable outlet for honey produced in British Columbia, and as a means of introducing this superlative sweet to many homes that have hitherto not known the taste of honey. It is a good channel direct to the consumer when properly conducted and no price slashing entered into, where the consumer can talk with the producer of the honey and obtain information that will cause him to have confidence in the food he is purchasing. I might add that nothing is allowed to be sold on this market that is not produced in British Columbia, and producers or their agents must handle the product direct from the ranch.

Boiling Out Foulbrood

In Michigan, Professor Kelty's April Beekeepers' Letter contains the following which should be well remembered by readers:

"An occasional inquiry is received regarding the proper method for treating diseased honey by boiling to make it safe for feeding bees in the spring. In the first place, it positively is not safe to feed bees honey taken from colonies affected with American foulbrood, even though this honey has been boiled. A Newaygo County beekeeper diluted American foulbrood one-half with water and boiled the solution twenty minutes in a closed vessel before feeding, but American foulbrood developed in every colony fed with this mixture.

"In the second place, the boiling of honey reduces its value as a food for bees. Bees can digest sugars readily, but they cannot digest gum. The overheating of honey caramelizes the sugars, making them less digestible for bees. Boiled honey should never be fed except when bees can fly almost daily, and it should never be fed in the open, on account of the danger of spreading disease."

Dr. White's experiments show that it takes a half hour to kill the germs of foulbrood by boiling. Better figure three-quarters of an hour, if you must use suspicious honey.

CLEAN UP FOULBROOD NOW WITH



**Infected Frames and Bodies Should be Treated Now
Honey Robbed from Stored Frames May Carry Infection to Healthy Colonies**

Bee experts everywhere advise beekeepers to clean up Foulbrood Hive Bodies and Frames NOW, instead of storing for attention later. Honey from Foulbrood Frames extracted now and put in cans will prevent re-infection. Honey from Foulbrood Frames allowed to stand in the store house is a continued source of re-infection.

Sterilizing the Foulbrood Frames NOW allows them to be used for the rest of this season and prevents equipment being tied up.

Mail Trial Order Today.

GENERAL LABORATORIES
MADISON, WIS.

PRICES

1 gal. pkg. ----- \$ 3.00
5 gal. pkg. ----- 12.50

GENERAL LABORATORIES,
Madison, Wisconsin.

Enclosed find check for which send
----- gal. of B-H.

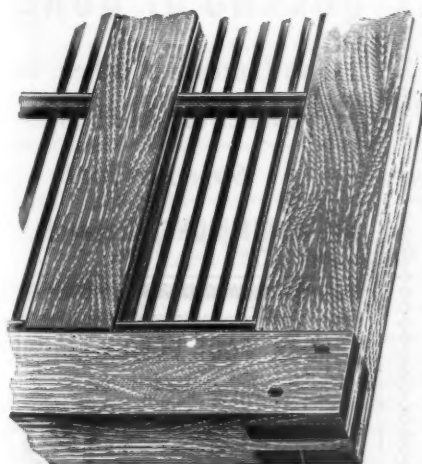
Ship ----- Frt. ----- Exp.
I agree to pay transportation charges.

Name -----

Address -----

A REAL QUEEN EXCLUDER

Root's 7-Wire Queen Excluder is, without any question, the best excluder on the market today. Our Queen Excluder has the following qualities:



1. Made of coppered wire, uniform in size and spaced exactly .163 of an inch apart, the proven space for excluding queens and permitting workers to pass readily. The wires are held in place by strong cross braces every few inches.
2. Extremely rigid and maintaining a bee space above and below the excluder. This reduces the formation of burr comb.
3. When tossed on the ground there is no damage caused by projecting sticks, stones, etc., and the spacing is not changed in any way.
4. The round wires permit the bees to pass through rapidly and immediately, providing them a means of pulling themselves through, thereby assuring more trips to the field and a greater honey harvest.
5. The coppered wire is absolutely smooth and consequently does not fray the wings of the bees nor retard their passage.

There is None Other as Good

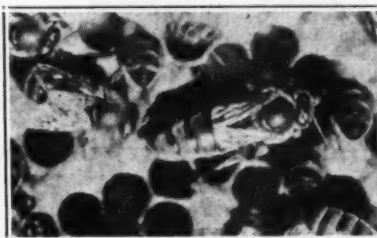
THE A. I. ROOT COMPANY, West Side Station, Medina, O.

IS IT WELL WITH THE SOUL of your COLONY

Dr. Miller said: "The queen being the very soul of the colony, I hardly consider any pains too great that will give better queens." Therefore, if your colony has a black, wicked soul, remember we can convert it so that the colony will indeed be born again. Write for literature.

PRICES:

Before July first.	
1 to 4	\$2.00
5 to 9	1.95
10 or more	1.90
After July first.	
1 to 4	\$1.50
5 to 9	1.45
10 or more	1.40



Breeding queens, service guaranteed for the season ----- \$10 each

JAY SMITH, Route 3, Vincennes, Ind.

RESULTS

"I certainly wish to congratulate you on the fine stock you are putting out, also the fair and honest business methods you are applying to your trade. It is a pleasure to deal with men like you and you certainly deserve due consideration in return." The letter went on to say this about a three-pound package of bees: "In handling them during the summer I found them very gentle, indeed, having been stung only twice. . . . I received 108 pounds of honey in addition to leaving 50 pounds for winter stores. I consider this production enormous, in view of the fact that a neighbor adjoining me has 100 colonies, thereby taking up the pasture, and in the fall we have a limited pasture anyway. This man's production fell far short of mine, I would say 40 per cent, at least." This is what Mr. Chas. D. Schmidt, R. F. D. 9, Helena, Montana, had to say about

FOREHANDS THREE BANDS The Thrifty Kind

We give you good service and good bees and queens, the kind that make your investment a pleasant and profitable one. For 31 years we have striven to produce a strain of bees that are surpassed by none, but superior to many, and today we offer you the results of our work. The praise of America's greatest beekeepers cannot be doubted.

We guarantee pure mating and perfect satisfaction the world over and safe arrival in the United States and Canada.

	1	12 to 25	25 to 99	100 up
Untested queens	\$1.00	\$.85	\$.80	\$.70
Select untested	1.25	1.00	.90	
Tested	2.00	1.75		
Select tested	2.50	2.25		

Pound bees: Prices same as in May advertisement.

W. J. FOREHAND & SONS, Fort Deposit, Ala.



HIGH GRADE ITALIAN QUEEN

BY RETURN MAIL

3-Banded Leather Colored. Bright Yellow. Last season we added two breeding queens to ours, one from the A. I. Root Co., and one from Jay Smith, and are rearing queens from them in separate yards.

	1 to 9	10 to 24	25 to 50
Untested queens	\$1.25 ea.	\$1.15 ea.	\$1.10 ea.
Select untested	\$1.50 ea.	\$1.40 ea.	\$1.35 ea.
Select tested	\$2.25 ea.		

FRANK BORNHOFFER, Mt. Washington (Cincinnati) Ohio

PORTER



**BEE
ESCAPE
SAVES
HONEY
TIME
MONEY**

For Sale by all dealers

If no dealer, write factory

R. & E. C. PORTER, MFRS.
Lewistown, Ill., U. S. A.

(Please mention Am. Bee Journal when writing)

QUINN'S QUEENS of QUALITY

Have no superior, "There's a reason," are Mendelian bred, good qualities accentuated GRAY CAUCASIANS, GRAY CARNIOLANS, GRAY LOWER AUSTRIAN queens; also CYPRIANS, the 3-banded yellow bee. Queens imported in 1922, insure extreme vigor. Laws of heredity strictly observed. My queens are produced by selective breeding, in accord with these laws of nature that must be understood and applied before the best can be had. And is found only in Quinn's Quality Queens. A trial will convince YOU of their value, as satisfied patrons testify by repeat orders. Internationally known the world over.

CHAS. W. QUINN

Powhatan, Va.

My June Queens Build Strong Colonies

Pure three-band ITALIANS that get the honey

1 untested	75c
25 untested, each	70c
50 untested, each	65c
100 untested, each	60c
Tested, each	\$1.50

No disease.

Orders filled promptly, or good reason given.

D. W. HOWELL, Shellman, Ga.

QUEENS OF QUALITY

Italian Untested 100 ea. \$65.50

Select untested \$125

Safe Arrival

E. A. SIMMONS, Greenville, Ala.

BARNES' FOOT POWER MACHINERY

Read what J. E. Parent of Chariton, N. Y., says:

"We cut with one of your Combined Machines last winter 50 chaff hives with 7-in. cap, 100 honey-racks, 500 frames and a great deal of other work."



W. F. & JOHN BARNES CO.,
995 Ruby St., Rockford, Ill.

Importance of Marketing

The American Institute of Agriculture located at Chicago, which is a correspondence school, sends out a small booklet which it has been our pleasure to read. Remarks made upon the value of marketing seem so important to the writer that we take the liberty of quoting as follows:

"For ten years marketing, as distinguished from production, has received rapidly increasing recognition of agricultural leaders as the phase of industry requiring closer study and better organization. Formerly emphasis was laid almost exclusively on crop rotation, fertilization, better breeding and making two blades grow where one grew before. Without relaxing attention to those matters, agricultural leaders have now turned their thought to analyzing and improving their means of distribution, of getting their wheat, their meat, their cotton, dairy products, fruits, vegetables and poultry from the farms to the consumer with economy of effort and expense. They must find a market for the second blade. During the last four or five years especially, the active talk at meetings of agricultural associations, in the farm press and about the state and federal departments of agriculture, has related to such problems as farmers' co-operation, rural credits, banking machinery for moving the crops, transportation, exchanges,

storage warehouses, grading and standardization.

"This swing toward marketing is exemplified by the fact that the Bureau of Markets, the newest division of the U. S. Department of Agriculture, has become one of the largest. It is in marketing that farmers discover their industry is tied up inseparably with railroads, banks, produce and stock exchanges, city markets, refrigerating plants, stock yards, elevators, chain stores, and other institutions of commerce. In the other direction, the so-called 'business men' have contact with the interests of the farmer in the marketing field, and consequently they now realize more urgently that material and moral benefit accrues to them in working out better methods of distribution. Similarly, the public, the consumers, have become acutely conscious that the volume and cheapness of their food supply depend on better business arrangements for the farmer and the distributors, resulting in stability for all. Thus has arisen general appreciation of David F. Houston's statement that 'Marketing is the other half of Agriculture.'"

Which is the Best Bee State?

The Government crop statistics throw some interesting light on the subject of the localities furnishing the best yields. This, however, is not

altogether due to especially favorable local conditions, as there are many poor beekeepers in good locations who keep down the average production.

According to the Government figures North Dakota, which is the newest state to claim attention as a beekeeping regions, leads the list with an average production of 157 pounds per colony. South Dakota comes next with 105 pounds; Idaho, 71; Oregon, 70; Washington, 76; California, 75; Illinois 78, and Iowa 80. Since last year was a poor one in some localities one year's crop is not sufficient to give a basis for a permanent average. In the north the poor beekeeper loses heavily in winter and counts only the colonies that are left in figuring his season's average. In the south most of the losses are from starvation, but many very weak colonies come through the winter, and with the longer and lighter flows a much greater portion of the honey is consumed in brood rearing out of season.

With the great extension of the acreage of sweet clover the Dakotas are likely to lead in per colony production for some time. Since the winters are so severe that poorly cared for colonies are not likely to survive, better beekeeping is likely to be the rule than farther south. That is no place for a beekeeper who does not know his business.

ROOT QUALITY QUEENS AND BEES

You Need Root Queens to Improve the Honey-gathering Qualities of Your Bees.
Give them a Trial and be Convinced of their Merits.

QUEEN PRICES APRIL 15 TO OCTOBER 15.

	1 to 9	10 to 24	25 to 49	50 to 99	Over 100
D312000—Untested, each	\$1.50	\$1.40	\$1.35	\$1.25	\$1.15
D313000—Select Untested, each	2.00	1.90	1.80	1.70	1.60
D314000—Tested, each	2.50	2.35	2.25	2.10	2.00
D315000—Select Tested, each	3.00	2.85	2.70	2.55	2.40

Prices of Bees in 2-lb. Combless Packages by Express—April 15 to August 15.

	1 to 9	10 to 24	25 to 49	50 or more
D310800—2-lb. packages of bees, each	\$6.00	\$5.50	\$5.00	\$4.00

PACKAGE BEES—Experience has taught us that two pounds of bees in a package will ship better than a lesser or a greater amount of bees. It has been demonstrated that better results in heavy producing are obtained from 2-lb. packages of bees than from 3-lb. packages.

Add price of queen wanted to package price given above. These prices are f. o. b. shipping point. Note: Early spring delivery on package bees will be made from Bay Minette, Ala. Beginning May 15, package orders can be filled from Medina.

THE A. I. ROOT COMPANY WEST SIDE STATION MEDINA, OHIO

GLASS AND TIN HONEY CONTAINERS

Both Glass and Tin Can Manufacturers have advanced prices. We are making no change in our prices.

2½-lb. Cans, Crates of 100	\$4.50
5-lb. Pails (with handles), Crates of 100	7.00
10-lb. Pails (with handles) Crates of 50	5.25
60-lb. Tins, 2 per case, new, per case	1.00
60-lb. Tins, 2 per case, used, very good	.25

WHITE FLINT GLASS with gold lacquered wax lined caps

8-oz. honey capacity; carton of 3 doz.	\$1.50
16-oz. honey capacity; carton of 2 doz.	1.20
3-lb. honey capacity (quart); carton of 1 doz.	.90

HOFFMAN & HAUCK, Inc., Woodhaven, New York

NO SECRET—

Why bees take to Airco first, and thus make larger honey yields by using it

- 1: Bees do not change the cell base of AIRCO as they do with other foundation.
- 2: The cell wall is more deeply imprinted, consequently queens egg a sheet of AIRCO sooner than any other foundation.
- 3: The aroma, the result of rendering wax without the use of acid, attracts the bees instantly. The taste is sweeter, too, for the same reason.

These are the reasons why the most economical, practical and successful producers in the mid-west today use Airco. These are the reasons why they can write such enthusiastic reports as these letters

"We have made some very careful and thorough tests with several brands of foundation. Upon the conclusion of these tests our entire order for foundation was placed with you.

Our tests proved very conclusively that 400 pounds of Airco foundation produced for us slightly more than 2,000 pounds more honey the first season than its nearest competitor would have done.

This is rather astounding when you consider that this saving more than paid for the entire cost of the foundation."

(Signed) Blackwell Honey Company, Rapid City, S. D.
November 3, 1922.

"One of the fine things about Airco is the workmanship of it. I am convinced, for instance, that one reason the bees take to it so well is because the cells are so sharply cut. For the same reason the foundation is stronger when wires are imbedded in it. And it's a pleasure to work with it. I am more than pleased with it, and am convinced, after careful trial, that it is all that is claimed for it.

I want to say that I know what I am talking about, as I used it in 1,000 frames, all of which were numbered, 1 to 1,000, and other foundation used was likewise numbered; so I had an opportunity to test exactly the merits of Airco foundation."

(Signed) H. C. COOK, Omaha, Neb.
November 5, 1922.

QUESTION—Why not make that increased yield this year, by using Airco? 24-hour service on foundation shipments assured.

THE A. I. ROOT COMPANY of IOWA
COUNCIL BLUFFS, IOWA

Crop and Market Report

Compiled by M. G. Dadant

No cards were sent out to reporters during May, inasmuch as there is very little honey left to market at the present time.

Reports coming into this office, however, from beekeepers and from dealers in honey, indicate that there has been considerable increase in demand for honey, not only on the part of the former sugar buyer, but also on the part of the direct honey consumer of honey.

As intimated in our May report, the long-continued high price of sugar has had its effect on the demand for honey to replace it, and as a result much of the honey in the West has moved eastward in carlots or in smaller quantities.

California reports practically its entire crop disposed of and the orange crop moving readily to market.

Utah, which had held something like 14 cars of honey in storage, had disposed of 8 cars of this by May 10th and expected to ship the balance eastward within a short time. The price received was not greatly advanced over what had been asked formerly, as some of this honey moved at 7½c and some at 8c f. o. b. shipping point.

In the Intermountain territory there are possibly a few cars of honey left on hand, but the situation is very much relieved and the demand still continues.

Idaho reports practically all honey now sold, as does Montana.

In the East there are some wholesalers of honey who still have considerable quantities on hand and there are also a few beekeepers scattered about who have varying lots.

However, it seems that the lack of the sale for this honey is largely due to the fact that the markets have not been thoroughly searched, as there is probably a place for the honey if it were offered in the right place.

The export notices from California show that a large quantity of the honey shipped out in April and May was shipped directly to New York City via boat, showing that the domestic demand has increased more than has the foreign demand.

Another favorable item to the American honey producers is the fact that practically all honey from Cuba and Porto Rico is now seeking foreign markets.

We have report of sale of a large quantity of Cuban honey through Belgium at a price of 80c per gallon f. o. b. Belgium, or about 50c per gallon f. o. b. producing point.

A letter just received from one of the largest commission firms in California today (May 16) is to the effect that they have a limited quantity of orange blossom honey on hand for which they are asking a price of 12c per pound f. o. b. California point.

This is an advance of about 1½c per pound over what orange honey was offered for a month ago.

Moreover, reports from California show that the orange crop will not exceed 20 per cent and in some instances will not be over 10 per cent of a normal crop, so there will be virtually a shortage of orange honey.

Other honeys in the South and Southeast have not materialized as of usual, from the fact that the weather has been so backward.

We believe that we are correct in assuming that the weather is behind last year from two to three weeks all over the country. In our own locality the first blossoms of clover usually appear before May 15, but although the clover plants are well stooled out here, there is not a sign of a blossom, and it will probably be near June 1st before the first blossoms appear. In fact, we are not looking for the beginning of the crop before June 15, which will be two weeks later than usual.

CROP PROSPECTS

We see no reason to look for a dearth of honey this year. The entire northern sections have been heavily

covered with snow during the winter, which is in itself a good sign that clover will come out in good shape.

Those sections formerly reporting very dry weather during the winter and spring have now had nice rains which have helped all of those sections which were favored with enough rains last fall to put the clover in good shape. Our reports are to the effect that the East generally is looking for a fair crop, whereas the Central West, especially the states of Illinois and Iowa, are very much spotted as to the clover prospects. In our own immediate territory clover prospects have not been as good since 1916.

California has been discouraged during the whole spring, but fortunately southern California was visited by a few very fine rains which have increased the prospects of honey from sage. Although amount of rainfall is not much over 50 per cent of last year, such rain as has fallen has saved the sage plants and there is possibility yet of a partial crop. The rainy season is practically over, so that likely the amount produced from sage will not range nearly as high as a year ago.

CONDITION OF BEES

It would be our opinion that bees are going to be in much better shape for the honey crop when it comes than had been anticipated a month or six weeks ago. This arises from the fact that bees have been breeding right along, whereas honey plants have been retarded so that the bees will approach normal conditions by the time honey plants begin to bloom. This is true at least in the Central West.

There have been considerable losses in the North from the extremely long, cold winter. However, these are being recouped in part by shipment of bees from the South. The Southern breeders are reporting very backward weather and in many instances are having to refund on orders from the fact that they are not able to supply the bees when the northern producer wants them.

It is a fact, however, that orders for bees and queens are not nearly as heavy as they were a year ago or two years ago, and in most instances the breeders of the South are anxious for orders, if given sufficient time so they can wait until desirable weather to ship.

It has been our experience that in many instances the northern producer orders his bees much too early, they arriving during the cold weather, and the bees being retarded rather than advanced by the early shipment.

SUMMARY

All in all, prospects seem favorable this year for at least a normal crop throughout the country, with bees being probably a little below normal condition for gathering the crop in the East and Central sections.

In California the crop will undoubtedly be cut down. Texas has missed out on some of its earlier crops, but is still expecting good things if the weather is favorable.

Bad weather also in the Southeast has curtailed the earlier crop of honey, but abundant moisture within the last few weeks makes it seem as if the latter crops would, in part, make up for the earlier loss.

The Government report states that Porto Rico is expecting better than normal yield this year.

Without a doubt there will be very little honey carried over into the new crop, and with a continued high price of sugar this should be well disposed of before the new crop is well on the market. Honey prices in a jobbing way have stiffened somewhat and retail prices are being maintained fairly well. We look for the new honey to open on the market at a better price than a year ago.

CLASSIFIED DEPARTMENT

Advertisements in this department will be inserted for 5 cents per word, with no discounts. No classified advertisements accepted for less than 35 cents. Count each initial or number as one word.

Copy for this department must reach us not later than the 15th of each month preceding date of issue. If intended for classified department it should be so stated when advertisement is sent.

As a measure of protection to our readers, we require references of all new advertisers. To save time, please send the name of your bank and other references with your copy.

BEES AND QUEENS

NEW HONEY IN JULY—Atwater.

"BEAR'S MOUNTAIN BRED BEES"—I have all the orders I care to fill this year.
Hiram H. Bear, Hinton, W. Va.

INSURE your honey crop; order Simmons' queens and nuclei now. Get our prices.
Fairmount Apiary, Livingston, N. Y.

EUREKA QUEENS—American Breed—For particulars address A. C. F. Bartz Co., Keystone, R. F. D., Jim Falls, Wis.
Reference: Bank of Bloomer, Bloomer, Wis.
NUCLEI, PACKAGE BEES and ITALIAN QUEENS for spring delivery, the kind customers recommend to their friends. We have been shipping queens and bees for many years and aim to please our customers. Three-banded Italian queens, untested, \$1; tested, \$2. Write for price list on breeders, combless bees and nuclei.
Allenville Apiaries, Allenville, Ala.

FOR SALE—Italian queens, \$1.00 each; 1 doz., \$11; \$80 per 100. One 3-frame nucleus, \$5 with queen; 3 lbs. bees, \$6. All orders booked with 10 per cent by June 1, 5 per cent discount. Orders delivered at once.
Hickory Shade Apiary, Otterville, Mo.

TRY PETERMAN'S QUEENS—They mean 100 per cent quality, select, thrifty layers, well laid up before caging bred from Jay Smith choice breeders by a thoroughly experienced breeder who is absolutely honest and reliable. Repeat orders prove this. Circular free. Prices, after July 1: 1, \$1; 6 for \$5.50; 25 at 90c each.
H. Peterman, Lathrop, Calif.

3-BANDED ITALIAN QUEENS of best quality. I am taking in with me as owner of half my bee business, Mr. D. E. Shaner, vocational student from Greensboro Agricultural and Apicultural Institute, of Alabama. We expect to retain the same motto, clean, honest, and square dealing, as I have kept up in the past. This is my 23rd season with the bees, 12th year of queen breeding. Prices, one for \$1.25, six for \$7, 12 for \$13. Health certificate.
Curd Walker & Shaner, Queen Breeders, Scotts Sta. Ala.

I AM READY to fill orders at reduced price, Caucasian or Italian 3-frame nuclei and queens.
Peter Schaffhauser, Havelock, N. Carolina.

FOR SALE—Three-frame nuclei hybrid bees with guaranteed pure untested Italian queen, \$5 each. Safe arrival guaranteed.
Carl L. Wilson Apiaries, Mt. Vernon, Ga.

NUCLEI and package bees; send for circular.
Allen Latham, Norwichtown, Conn.

GOLDEN ITALIAN QUEENS—None better. One, \$1.00; six, \$5.00; twelve, \$10. Select, one, \$1.25; six, \$7.00; twelve, \$18. Virgins, one, 60c; 12, \$5.00. Clipped when requested; ready April 15. Money back if not satisfied.
Crenshaw County Apiary, Rutledge, Ala.

SHE-SUITS-ME QUEENS—1923, after June 1, \$1.50 each. One dollar per queen when ordered four weeks or more in advance.
Allen Latham, Norwichtown, Conn.

BIG bright Golden Italian Queens, the kind that are bred for beauty and also honey gathering qualities. We guarantee to please you. Price, untested, \$1.25 each, 6 for \$6.00, 12 for \$11.00; \$85 per 100. Tested, \$2.00.
Honorville Bee Co., Honorville, Ala.

GOLDEN ITALIAN QUEENS—Produce bees solid yellow to tip; disease resisting, prolific, gentle and good honey gatherers. Untested, \$1.25; select untested, \$1.50 each; tested, \$3.00.
Dr. White Bee Company, Sandia, Texas.

FOR SALE—Missouri bred Italian queens, \$1 each; 6 for \$5.
L. E. Altwein, 1206 N. 18th St. St. Joseph, Mo.

FOR SALE—Golden queens of 15 years' careful breeding; untested, \$1.25 each, or 6 for \$7.00; 12 or more, \$1.00 each. Tested, \$2.00 each. One-lb. package with untested queen, delivered, \$3.25; 2-lb. package with untested queen, delivered, \$5.00. Promptness and satisfaction my motto. Shipments beginning about April 15.
R. O. Cox, Box 25, Rutledge, Ala.

GOLDENS, Italian queens for 1923. The big, bright, hustling kind. Satisfaction guaranteed. Price, \$1 each, six for \$5, twelve for \$10, one hundred for \$75. Tested, \$1.75 each. Also a few two-frame nuclei, with queen, for \$4.75.
E. F. Day, Honorville, Ala.

UNSURPASSED ITALIAN QUEENS—Ready June 1. Untested, 1, \$1.25; 6, \$7; 12, \$12.50; 50, \$50; 100, \$95. Tested, 1, \$2; 6, \$11. Every queen is mated and laying before she is mailed.
J. D. Harrah, Freewater, Ore.

FOR SALE—Bright three-banded Italian queens, 1 to 12, \$1.25 each; 13 to 25, \$1.15 each; 10 per cent discount when ordered 4 weeks or more in advance. Safe arrival and satisfaction guaranteed. Ready to ship June 1 to June 10.
R. B. Grout, Jamaica, Vt.

"Florida First" Queens for April, May and June, \$1.50 each; 5 for \$7. Circular free.
R. C. Boswell, Manager, Indian River Apiaries, Wilson, Fla.

GOLDEN QUEENS, GOLDEN—Ready after April 1. Untested, 1, \$1.25; dozen, \$11; select untested, 1, \$1.50; dozen, \$13.50. Write for prices on nuclei and pound packages. Pure mating and safe arrival guaranteed in U. S. and Canada.
Tillery Bros., R. 5, Greenville, Ala.

PACKAGE BEES for 1923—Now booking orders for Yancey Hustlers. See larger ad for prices.
Caney Valley Apiaries, Bay City, Texas, Yancey Bros., Owners.

FOR descriptive price list of Carniolan, Caucasian, Italian and Golden queens, write to Grant Anderson, Rt. 2, Waco, Texas.

HARDY ITALIAN QUEENS, \$1 each.
W. G. Lauer, Middletown, Pa.
BEES BY THE POUND, ALSO QUEENS—Booking orders now. Free circular gives prices, etc. See larger ad elsewhere.
Nueces County Apiaries, Calallen, Texas. E. B. Ault, Prop.

SEE my display ad in this number.
Jes Dalton, Bordelonville, La.

BEES AND QUEENS at reduced prices. Cypress hives for sale. Write for terms.
Otto Diestel, Elza, Ga.

FOR SALE—On account of low prices in honey, I am offering bees at pre-war prices. Package bees, 5 to 10 lbs., at \$1.35 per lb.; 10 to 25 lbs., at \$1.20 per lb.; 25 to 100 lbs., at \$1.10 per lb.; over 100 lbs., at \$1.00 per lb. Entire satisfaction guaranteed. Write for special low prices on queens, nuclei and full colonies of bees. Bank references furnished on request.
Winfield Gear Apiaries, Walnut Grove, Calif.

PETERMAN'S 100% QUEENS—\$1 each, 6 for \$5.50. Give them a trial.
H. Peterman, Lathrop, Calif.

CONNECTICUT QUEENS—Highest grade 3-banded Italians. Ready June 1st. Untested, 1, \$1.15; 12, \$12; 50, \$47.50; 100, \$90. Two-pounds bees with queen, \$4.50; 3 pounds with queen, \$5; 3 frames with queen, \$6. No disease. Safe arrival and satisfaction guaranteed. Conn. Valley Apiaries.
A. E. Crandall, Berlin, Conn.

FREE! FREE! FREE!—We will give free with each order for queen or bees, one of our patent applied for brood frames that we guarantee no sagging and the bees will build to the bottom bar—then see your nice comb. Queens, \$1.00. Circular free.
Mr. Russell, Roxbury, Ohio. Dear Sir—

The cheap cull queen from imported mother bought of you, wintered on two-frames with quart of bees, stored 100 lbs., a daughter 50 lbs. Thirteen powerful colonies with southern bred queens have 20 to 65 lbs less stores than in April, have made no surplus. This is a poor bee territory and has been the poorest year in past 40. Culls that can get honey while others starve is good enough for me. Yours,
E. B. Foster.

F. M. Russell, Roxbury, Ohio.

THREE-BAND bright Italian queens for 1923. Guaranteed purely mated. Good hustlers and gentle. One, \$1.00; 6, \$5.00; 12, \$9.00. Write for folder or the principle of introducing. Orders booked as received.
J. Frank Diemer, Liberty, Mo.

CARNIOLANS and ITALIANS—I work for normal conditions that produce good normal queens. No better bees exist than stock my apiaries. The best known introducing cage and instructions free, with 12 untested queens, 1, \$1.25; 6, \$7; 12, \$13; 25 or more \$1 each.
M. G. Ward, Lathrop, Calif.

100 2-LB. PACKAGES Italian bees and queens, May and June delivery. Shipped on frame of wired foundation. Untested, \$6.00; tested, \$7.00; tested queen only, \$2.50. For June, will supply queens bred from a daughter of Cutts Famous 577-pound honey queen, that has made extra good in our yard. Orders must be booked ahead. Send for our circular.
E. F. Quigley & Son, Unionville, Mo.

QUALITY ITALIAN QUEENS, large, gentle and prolific; \$1.00 each, \$10 per dozen.
J. J. Scott, Crowville, La.

"THE PROOF of the pudding is the taste thereof," so with queen bees, you can't judge their quality by a long page ad. Try my 3-banded Italian queens and know their worth. Select untested queens \$1 each, \$10 dozen. Circular free.
P. M. Williams, Ft. Deposit, Ala.

FINEST ITALIAN QUEENS—\$1.00 each.
Wm. R. Stephens, Wingate, Ind.

RUSH YOUR ORDER—Pure Italian queens: Selected tested, 1, \$1.25; 12, \$12. Selected untested, 1, 80c; 12, \$8.00; 100, \$60. Safe arrival and satisfaction guaranteed; no disease; ship nothing but the best.
W. C. Smith & Co., Calhoun, Ala.

THREE-BAND ITALIANS—My stock is developed by continuous selection from the best and most popular strains in the country. When I can produce or discover better they will be adopted. Queens: untested, after May 15, \$1.50 each, six for \$8. Tested, \$2.50 each. CARNITALIANS, a cross derived from pure imported Carniolan mothers and Italian drones. Tested queens, June 1, \$2.50 each.
Protheroe, Rustburg, Va.

BURLESON'S three-banded Italian queens; none better; for balance of this season, 1, \$1; 12, \$10.50; 100, \$80. Send orders and money to my manager, J. W. Seay, Mathis, Texas. T. W. Burleson, Waxahachie, Tex.

2 POUNDS of Italian bees and queen, for June and July delivery, \$5.
J. F. Diemer, Liberty, Mo.

QUEENS—High grade Italian queens, three-banded; also goldens. Untested, one, \$1.25; six, \$6.50; twelve, \$12. Tested, one, \$2.00; six, \$11.50; twelve, \$22. Package bees. Safe arrival and satisfaction guaranteed.
P. O. Watkins, Cullasaja, N. C.

FOR SALE—Golden Italian queens; untested, \$1.15; six, \$6.50; twelve or more, \$1 each. Tested, \$2 each. After June 30, untested \$1; six, \$5.40; twelve or more, 80c each. Tested, \$1.50. No disease.
Hazel V. Bonkemeyer, Randleman, N. C., Route 2.

FOR SALE—Golden Italian queens. One untested golden Italian queen, \$1. One tested queen, \$2. Safe arrival and satisfaction guaranteed.
J. F. Michael, Rt. 1, Winchester, Ind.

THREE-BANDED ITALIAN QUEENS—Select, untested, \$1.00. Select, tested, \$1.50. Two-pound package bees with select untested queen, \$4. Reference: The Selma National Bank, Selma, Ala. Satisfaction given.
J. Allen, Catherine, Ala.

IF WANTED—Good, bright Italian queens by return mail. Send your order for queens to us; \$1 each, \$10 per dozen, \$75 per 100. Safe arrival, pure mating, reasonable satisfaction guaranteed.
P. B. Skinner, Greenville, Ala.

WARRANTED pure mated Italian queens, \$1.25 each; ready to mail June 15, in sure introducing cages. No honey used in candy. Daniel Danielson, Brush, Colo.

FANCY THREE-BAND BEES nuclei and queens. Queens, balance of season, select untested, \$1 each, \$10 a dozen. Select breeding queens \$6 each. J. L. Morgan, Apalachicola, Fla.

WILLOW DELL three-banded Italian queens and nuclei, the kind that bring results. Best to winter; none better. A trial will prove it. May delivery with queens; 2-frame nuclei, \$4.00; 3-frame, \$5.25; Jumbo frames, \$4.50 and \$5.75; queens, \$1.25 each. H. S. Ostrander, Mellenville, N. Y.

HOLLOPETER'S Quality Queens plus Satisfactory Service, makes each season better. Select untested queens from finest three-banded stock, June, each \$1.50; 6, \$7.50; 5 per cent books order and insures timely delivery, Circular. J. B. Hollopeter, Rockton, Pa.

PURE ITALIAN QUEENS—Untested, \$1.00; tested, \$1.25; 2-lb. package, \$2.75. Add price of queen wanted. Safe arrival guaranteed after May 10. Write for prices on colonies and other specials. Birdie M. Hartle, 924 Pleasant St., Reynoldsville, Pa.

QUEENS bred from choice Jay Smith breeders, \$1 each, 6 for \$5.50; every queen guaranteed select, thrifty layer. H. Peterman, Lathrop, Calif.

PURE Italian and Carniolan queens, the best of either race, \$1 each. J. E. Wing, 155 Schiele Ave., San Jose, Calif.

FOR SALE—Golden Italian queens: Untested, \$1.15, 6 for \$6.50; 12 or more, \$1 each. Tested, \$2. Select tested, \$3. After June 30. Untested, \$1; 6 for \$5.40; 12 or more 80c each. Tested, \$1.50. Select tested, \$2.50. No disease. Safe arrival. D. T. Gaster, Randleman, N. C., Rt. 2.

FOR SALE—1923 Golden Italian queens, \$1; dozen \$10. Safe arrival and satisfaction guaranteed. J. J. Sanford & Son, McKenzie, Ala.

CARNIOLAN-ITALIAN CROSS—Finest utility queens yet. While they last, \$1 each. Geo. W. Coltrin & Son, Mathis, Texas.

FOR SALE—Griggs' super Italian queens. June 1, untested, \$1.50 each; tested, \$2 each; choice breeders, \$10 each. Special price on 50 queens or more. Every colony in my breeding yard is headed by a breeding queen. L. S. Griggs, 711 Avon St., Flint, Mich.

PINARD'S quality of Italian queens and package bees. Laying, untested queens, \$1 each. Write for prices on large lots. Circular free. A. J. Pinard, Morgan Hill, Calif.

QUEENS for the balance of the season of 1923. Write and get our prices. O. P. Hendrix & Son, West Point Miss.

HONEY AND BEESWAX

"BEAR'S MOUNTAIN BRED BEES"—I have all the orders I care to fill this year. Hiram H. Bear, Hinton, W. Va.

FOR SALE—White and amber extracted honey. Write for prices. State quantity wanted. Dadant & Sons, Hamilton, Illinois.

HONEY FOR SALE—In 60-lb tins; water white orange, 14c; white sage, 12c; extra light amber sage, 10½c New York State buckwheat, 10c, for immediate shipment from New York. Hoffman & Hauck, Woodhaven, N. Y.

FOR SALE—Our own crop white clover and amber fall honey in barrels and cans; also white alfalfa in cans. State quantity wanted and we will quote prices. Samples on request. Dadant & Sons, Hamilton, Ill.

FOR SALE—Choice clover extracted honey in new cans and cases, in carload lots or case lots. Quality unexcelled. Write for prices stating quantity desired. J. D. Beals, Oto, Iowa.

FOR SALE—White honey in 60-lb. cans; also West Indian in 50-gal. barrels. Samples and prices on request. A. I. Root Co., 93 Leonard St., New York City, N. Y.

BEESWAX WANTED—We need large quantities of beeswax and are paying good prices now. Ship to us at Hamilton, Ill., or Keokuk, Iowa, or drop us a card and we will quote f. o. b. here or your own station, as you may desire. Dadant & Sons, Hamilton, Ill.

FOR SALE—Twenty cases of white comb honey, \$3 per case; also some 8-frame supers. Virgil Johnson, Melvin, Ill.

FOR SALE—Clover honey. Write for prices. Lewis Klaty, Carsonville, Mich.

FOR SALE—Four barrels, 575 lbs. each, white clover honey, for quick shipment at 9c a pound. Write today. E. J. Baxter, Nauvoo, Ill.

FOR SALE—Supers with drawn comb, and comb honey. Carl Franke, Mauston, Wis.

SUPPLIES

NEW HONEY IN JULY—Atwater.

FOUNDATION at jobbing price, 100 lb. lots. A. V. Small, successor to C. F. Buck, Augusta, Kans.

CONNECTICUT and Rhode Island headquarters for Root's Beekeepers' supplies. A. W. Yates, 3 Chapman St., Hartford, Conn.

WESTERN BEEKEEPERS—We can demonstrate that you can save money on buying bee supplies of best quality. Write for our latest price list. The Colorado Honey Producers' Association, Denver, Colo.

HAVE YOU any Bee Journals or bee books published previous to 1900 you wish to dispose of? If so send us a list. American Bee Journal, Hamilton, Ill.

FOR SALE—New and used 10-frame hives, complete, cheap; two foundation mills. Brood and thin. Write for price. Must sell. A. D. Wood, Long Lake, Mich.

FOR SALE—200 second-hand 8-frame hives, complete, \$1 each. Also 300 supers with section holders, 40c each. Good as new. Lots to right buyer. Free from disease. John Roorda, Thayer, Ind.

FOR SALE—A new Novice two-frame extractor, \$17.50. Zygmund Cholewinski, Hillsboro, Ill.

FOR SALE

FOR SALE—Good second-hand 60-lb cans, 2 cans to a case, boxed, at 60c per case, f. o. b. Cincinnati. Terms cash. C. H. W. Weber & Co., 2163 Central Ave., Cincinnati, Ohio.

FOR SALE—Our own crop white clover and amber fall honey in barrels and cans; also white alfalfa in cans. State quantity wanted and we will quote prices. Samples on request. Dadant & Sons, Hamilton, Ill.

FOR SALE—New 10-frame standard hives nailed and painted, \$2. and 15 colonies of bees. F. Olson, 1923 Grand, St. Paul, Minn.

FOR SALE—Strong, healthy colonies Italian bees, guaranteed. Frank Coyle, Penfield, Ill.

FOR SALE—90 new colonies Italian bees in newly painted hives. Geo. Weber, Genoa, Ill.

FOR SALE—Apiary of about 60 colonies, with complete super and extracting outfit and fine location. Bargain for cash before July 1, or \$10 per colony in small lots. Address, James McKee, Riverside, Calif.

MISCELLANEOUS

NEW HONEY IN JULY—Atwater.

THE "Archiv fur Bienenkunde" is a valuable scientific publication. "It merits the appreciation of all beekeepers acquainted with the German language," says the Bee World (January, 1923). "The Archiv fur Bienenkunde, now in its fifth volume, is of as high grade as any bee journal which comes from abroad, dealing especially with the scientific aspects of beekeeping," says Gleanings in Bee Culture (February, 1923). Annual subscription, \$1. Specimen copy free. Publisher, Theodor Fisher, Freiburg im Breisgau, Kirchstrasse 31, Germany.

THE BEE WORLD—The leading bee journal in Britain, and the only international bee review in existence. It is read, re-read and treasured. Will it not appeal to you? Specimen copy free from the publishers. The Apis Club, Benson, Oxon, England. Send us a post-card today. It is well worth your little trouble.

WOULD BUY comb honey and barrels of honey. A. S. Jamison, 690 Adams Ave., Memphis, Tenn.

HONEY LABELS that have broken away from the "all-look-alike bunch." Made to suit your ideas. Lowest prices. Sample free. Liberty Publishing Co., Sta. D, Box 4025, Cleveland, Ohio.

SITUATIONS

WANTED—Married man to care for 80 colonies run for extracted honey; also work in commercial orchard. Part furnished house rent free. Chance to run on shares next year. H. W. Funk, 710 W. School St., Normal, Ill.

WANTED—Man to work bees coming season. Give age, experience and wages wanted. Address, The Rocky Mountain Bee Co., Box 1319, Billings, Mont.

WANTED

NEW HONEY IN JULY—Atwater.

WANTED—Shipments of old comb and cappings for rendering. We pay the highest cash and trade prices, charging but 5c a pound for wax rendering. Fred W. Muth Co., 204 Walnut St., Cincinnati, Ohio.

BEESWAX WANTED—We need large quantities of beeswax and are paying good prices now. Ship to us at Hamilton, Ill., or Keokuk, Iowa, or drop us a card and we will quote f. o. b. here or your own station, as you may desire. Dadant & Sons, Hamilton, Ill.

WANTED—Old postal stamps and envelopes. R. LeMang, 25 Quincy St., Passaic, N. J.

CARNIOLAN and ITALIAN QUEENS \$1.00

J. E. WING, San Jose, Calif. 155 Schiele Ave.

QUEENS

We are booked up for this season on package bees and nuclei, but can furnish FINE LEATHER COLORED ITALIAN QUEENS at ONE DOLLAR EACH.

THE LOVEITT HONEY CO. 602 N. Ninth Ave., Phoenix, Arizona.

MONEY AND SATISFACTION FOR YOU

Save one profit by buying direct from factory. Standard, Jumbo and Modified Dadant Hives; cedar or pine. Write for catalog.

A. E. BURDICK, CO. Sunnyside, Wash.

WESTERN BEEKEEPERS!

We handle the finest line of bee supplies. Send for our 1923 price list. Our quotations will interest you. The Colorado Honey Producers' Association, 1424 Market St., Denver, Colo.

Berry's Reliable Italian Queens and Service

Twenty-seven Years of Select Breeding

Our queens continue to please old customer friends. Try them and learn the reason why. Little booklet describing our strain and methods of production mailed on request.

Price List of Our Queen Bees

Now ready to mail, or as per booking.

Select untested, \$1 each, 12 for \$10, 100 for \$75. Virgins, 50c each, 12 for \$5.
Select tested, \$2 each, 12 for \$20, 100 for \$150. Breeders, \$5 and up.

We guarantee our queens to be purely mated, to arrive in perfect condition and to give absolute satisfaction. Wings we clip free of charge, when requested.

M. C. BERRY & CO., Box 697, Montgomery, Ala., U. S. A.

NUCLEI, PACKAGE BEES and BRIGHT 3 BAND QUEENS

HARDY ITALIAN BEES and QUEENS, reared from the FINEST BREEDING STOCK, by methods and care such as give them qualities of their mothers. Read this from a veteran beekeeper who tried them: Mr. Ullis Blalock.

"Dear Friend: The season just closed has been very bad; no honey to speak of. The queens I bought of you are a fine lot, all extra good, and the largest and most prolific I ever saw, and every one purely mated. You get all my future orders. I got a square deal." (Name on request).

This is the kind of satisfaction I give and guarantee.

Prices: Packages, with queen, 1 lb., \$2.75; 2 lbs., \$4.00; 3 lbs., \$5.25. Nuclei, with queen, same price, 1, 2 and 3 frames, respectively. Queens, \$1.25 each. NO BETTER can be bought. There is no disease near here. I GUARANTEE safe arrival and complete satisfaction. Free booklet describes stock and methods. Write for it.

ULLIS BLALOCK, Christine, Texas

ITALIAN QUEENS

We can furnish you promptly SUPERIOR ITALIAN QUEENS and give you our broad guarantee on every one. We spare no pains in the selection of our breeders and methods of producing the queens we offer you.

OUR GUARANTEE OF QUEENS

We guarantee safe arrival and satisfaction on all queens and will refund your money or replace any dead or unsatisfactory queens, providing you return her at once in the cage you received her in, with your name and address on it.

PRICES OF QUEENS

One untested Italian queen	-----	\$1.25
Ten untested Italian queens	-----	\$10.00
Prices of 100 an application.		
One tested Italian queen	-----	\$1.50
After June 15th, 25c each less on untested.		

THE STOVER APIARIES, MAYHEW, MISS.

MONEY SAVED

BEE SUPPLIES

TIME SAVED

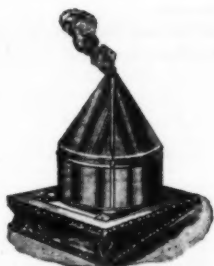
Roots goods at factory prices with WEBER'S Service

Send us a list of your wants and we will quote prices that will save
you money

C. H. W. WEBER & CO., 2163-65-67 Central Ave., Cincinnati, O.

Root Smokers

How would you like to smoke your bees with a cornpopper smoker or by building a smudge in a kettle and running the risk of burning your bees? That was the method used before 1877, when Mr. A. I. Root, that great pioneer of modern beekeeping, built commercially the first smoker in America. This first smoker was called the "Simplicity," and, as Mr. Root stated in *Gleanings in Bee Culture* in September, 1877, he put the bellows on the bottom and made it broad so the smoker would not tip over. This was the beginning of our present complete line of smokers.



A. I. Root's first Smoker, 1877,
the "Simplicity"

*The beginning but not the end, for we
are still leading*



The biggest seller today, 1923.
Root's "Standard"

THE A. I. ROOT COMPANY

West Side Station, Medina, Ohio

We have provided additional storage space for our Bee Supply Department to take care of the increasing demand, which now gives us ample facilities to take care and fill all orders promptly.

We thank our beekeeper friends for their
co-operation and support.

HOFFMAN & HAUCK, Woodhaven, New York

HONEY ADVANCING

WHY HAS HONEY ADVANCED?

BECAUSE:

- 1st. Accurate records show that the actual cost of producing a normal crop is 10c per pound. Why, then, should beekeepers sell below the cost of production?
- 2nd. Sugar has advanced several cents per pound during the past few months. Why, then, should the price of honey remain stationary.
- 3rd. California 1923 crop a failure. Not one pound of new crop orange blossom or sage honey is available for extracting in our California apiaries, and this condition is general throughout Southern California, due to unfavorable weather conditions and lack of rain. Sufficient wintering stores very doubtful.

PRESENT PRICES (Quantity Limited).

White quality, from orange or sage bloom, 12c lb., f. o. b. California points.
Light amber quality, from orange or sage bloom, 10c lb., f. o. b. California points.
White quality, from clover bloom, 10c lb., f. o. b. Utah and Idaho points.

(White clover honey is expected to advance to 12c shortly.)
These are carload prices; for smaller lots add 2c per pound.

SUPERIOR HONEY CO., OGDEN, UTAH

Branches at Idaho Falls, Idaho and Riverside, Calif.

For American Foulbrood Use

Dr. Hutzelman's Solution

PRACTICAL**ECONOMICAL****RELIABLE****SAFE**

Save your combs. They are the most valuable part of your beehive equipment. Any comb can be made free from disease at about half the present cost of frame and foundation. The labor of disinfection is much less than that of melting up diseased combs, nailing together and wiring new frames.

By following simple directions, any beekeeper who can successfully get rid of foulbrood by the usual method of shaking and destroying the diseased combs, can go a step farther and disinfect the diseased combs, so that they will be as good as they were before infected.

MY CLAIMS ARE AS FOLLOWS

1. The solution penetrates wax as it is found in a comb.
 2. The solution penetrates all propolis.
 3. Cells filled with pollen are penetrated.
 4. Diseased larvæ in all the stages characteristic of American foulbrood are disinfected.
 5. Surfaces of wax wet with honey are disinfected.
 6. The solution comes in intimate contact with every part of a comb ever touched by bees.
- Full information will be sent on request.

Patent Pending.

Prepared solely by the originator of the process.

DR. J. C. HUTZELMAN, Glendale, Ohio



Needed by Every Beekeeper Good Queens In Every Queen and Package



There is a guarantee of satisfaction that you have a right to expect
BUY FOREHAND'S 3-BANDS, YOUNG AND HUSKY

The three vital needs of successful honey production are, **GOOD QUEENS, GOOD MANAGEMENT and GOOD LOCATION.** You furnish one, Nature one and I furnish the other. But you must be the judge of all. You don't want a location in a desert, neither do you want poor queens. You have the same right to choose and reject queens as you have to choose your location. My guarantee allows you this.

Your dollar's worth or your dollar back. Order now and get your bees and queens when you want them. Ten per cent is all that is required with order.

Untested \$1.00 each; 10 or more, \$.90 each
Select untested \$1.25 each; 10 or more, \$1.25 each

Tested 1-4 5-11 12-24
Select tested 2.50 2.45 2.40
..... 4.00 3.95 3.50

All bees and queens guaranteed to reach you in good condition in the United States and Canada.
Write for prices on large lots.

1 25 and up
One pound pure Italian bees with young queen....\$3.00 \$2.90
Two pounds pure Italian bees with young queen.... 5.00 4.75
Three pounds pure Italian bees with young queen.... 6.00 5.75

N. FOREHAND, RAMER, ALABAMA

QUEENS

3-band Italians only. Select breeding. Up-to-the-minute methods. No more package bees or nuclei this season. We have just closed a most satisfactory shipping season.

Customers: We thank you, one and all, for your valued business. Having used our very best efforts to furnish you goods like we ourselves would like to get for hard cash, we wish you a bumper crop of honey.

During the period just past, we have been hard pressed to get queen orders out on schedule; bad weather was partly responsible for this. With package shipping out of the way and with settled weather prevailing, we expect to get all queens out on time. In fact, we guarantee to do this or return your money.

Our queens are beautiful to look upon, and results from them are a source of deep satisfaction.

We like queen-rearing, for good queens are the backbone of all beekeeping. Don't blame us if you do not make a good crop of honey, for we have told you that we have good queens and are offering them to you at a price you can well afford. There is no excuse for you keeping those old wornout queens nor hybrids or blacks.

Untested queens, 75c each, \$70 per 100. Select untested \$1 each, \$90 per 100. Tested, \$1.25 each. Breeders \$5 and \$7.50 each.

JENSEN'S APIARIES, CRAWFORD, MISS.



For years we have been shipping thousands of pounds of bees all over the U. S. and Canada

Order Direct from this Ad.



We are prepared to take care of your rush orders

2-pound package bees, \$3.75 each, 25 or more, \$3.60 each.
2-frame nuclei same price as 2-pound packages.
3-pound package bees, \$5.25 each; 25 or more \$5.00 each.
3-frame nuclei same price as 3-pound packages.

QUEENS FREE when 25 or more packages are ordered. For less than 25 lots, add the price of queen wanted.
Untested queens, \$1.00 each, 25 or more 85c each, \$70.00 per hundred.
This is a special **SALE** on untested queens of high quality.
Select untested, \$1.70, 25 or more \$1.50 each. Tested \$2.25 each, 25 or more \$2.00 each.
Select tested \$2.65 each, 25 or more \$2.25 each. Breeders \$5.00 to \$15.00.

ITALIAN

CARNIOLANS

GOLDENS

NUECES COUNTY APIARIES, Calallen, Texas



ACHORD QUEENS

**Honestly Bred.
Honestly Advertised.
Honestly Priced.**

Superior honey-producing stock. Bred in two of the largest, best equipped queen-rearing apiaries in the south. Vigorous, nicely marked, good-natured, three-banded Italians.

Promptly mailed to you in large, clean cages with 1923 inspection certificate.

Select tested, \$1 each; 5 for \$4.50; 10 for \$8; 20 or more, 75c each.
Select tested, \$1.50 each.

Safe arrival guaranteed if you will assist us by asking your rural carrier to notify you of their arrival and not leave them in a hot mail box. Large or small orders filled with equal promptness, with queens guaranteed to please you.

W. D. ACHORD, Fitzpatrick, Ala.

QUEENS OF Moore's Strain

OF ITALIANS PRODUCE WORKERS

**That fill the supers quick
With honey nice and thick.**

They have won a world-wide reputation for honey-gathering, hardiness, gentleness, etc.

Untested queens, \$1.25; 6, \$6.50; 12, \$12. Select untested, \$1.50; 6, \$8, 12, \$15. Safe arrival and satisfaction guaranteed. Circular free.

J. F. MOORE, QUEEN BREEDER.
Route 1, Morgan, Kentucky.

Mott's Northern Bred Italian Queens

Select untested, 1, \$1.00; select guaranteed pure mated, \$1.25; select tested, \$2.50. Virgins, 60c. Plans "How to Introduce Queens," 25c; 172 miles from Windsor, Canada. Save the vitality of your queens. Bees per pound, June delivery.

E. E. MOTT,
Glenwood, Michigan.

Honey in the Local Newspapers

A set of 25 articles on honey, specially prepared for distribution by the beekeeper to local papers to stimulate the demand for honey. These articles deal with interesting phases of beekeeping which will interest the ordinary reader and help make a buyer of him.

We offer the whole set of 25 articles at a postpaid price of only 50 cents, or in lots of ten or more sets at 35 cents each, postpaid.

A real opportunity to have your local people get interested in honey and its production and use.

Order a set today.

AMERICAN BEE JOURNAL
Hamilton, Ill.

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BURR COMBS

Some Comments on Honey and Supplies

By M. G. Dadant.

Honey and Sugar Prices

Does the honey price follow sugar? I say that it does, with exceptions. More than this, all ordinary commodities follow each other, with exceptions. These exceptions are, manipulation on the part of the speculator, excessive or restricted production, or special selling campaigns and publicity on the part of producer or middle man.

Glance at the accompanying Chart A, covering sugar and honey prices from 1910 to the present. They follow, generally, the same trend except during the war period, when sugar was controlled. Honey took its spurt in 1916-17, followed by sugar later when control was removed. Honey dropped with sugar, and has maintained low prices with it. Looking back over previous years, one sees that any advance or decline of sugar long maintained has meant eventually a corresponding change in honey.

In the present situation this spring, at first the sugar rise had no effect on honey prices, but it is now approaching the point of a long maintenance of price, and we are already noting the effect on honey demand.

Statisticians are free in predicting that the high sugar price probably first caused by manipulation, will be maintained well into the fall, their claims being that a crop shortage accompanies the advance and will defend it against any investigation.

Should this be the case, and should my premises be sound, honey probably would maintain relatively high levels into the early fall season, following sugar in the slump when it

comes, unless some of the exceptions above noted interfere.

All of which leaves us to draw our own conclusions. Certain it is that statisticians in business lines, with a long past record of price levels on which to draw, are becoming more and more accurate in their predictions. Unfortunately, honey is among the lesser commodities and has not received the attention which would warrant any suggestions, unless we can compare it with sugar.

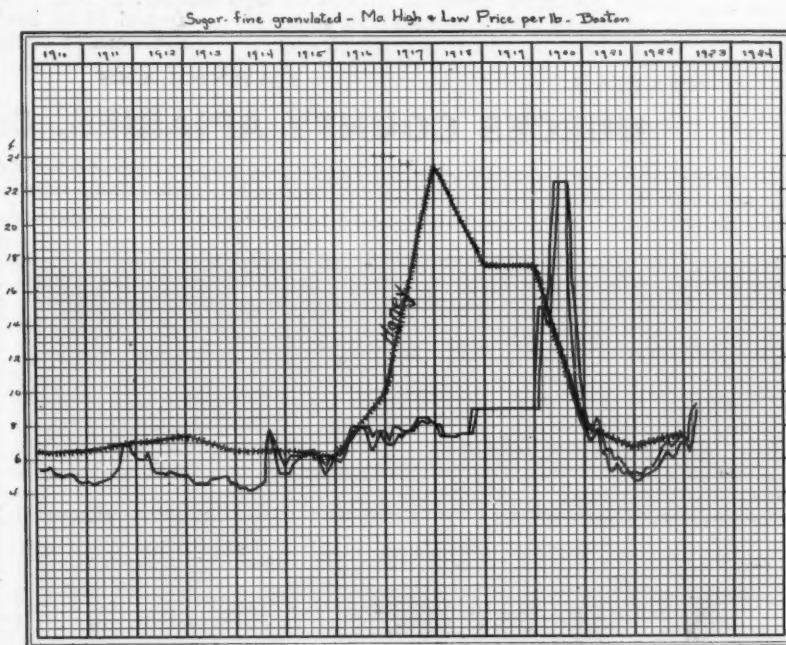


Chart A, showing range of honey and sugar prices.

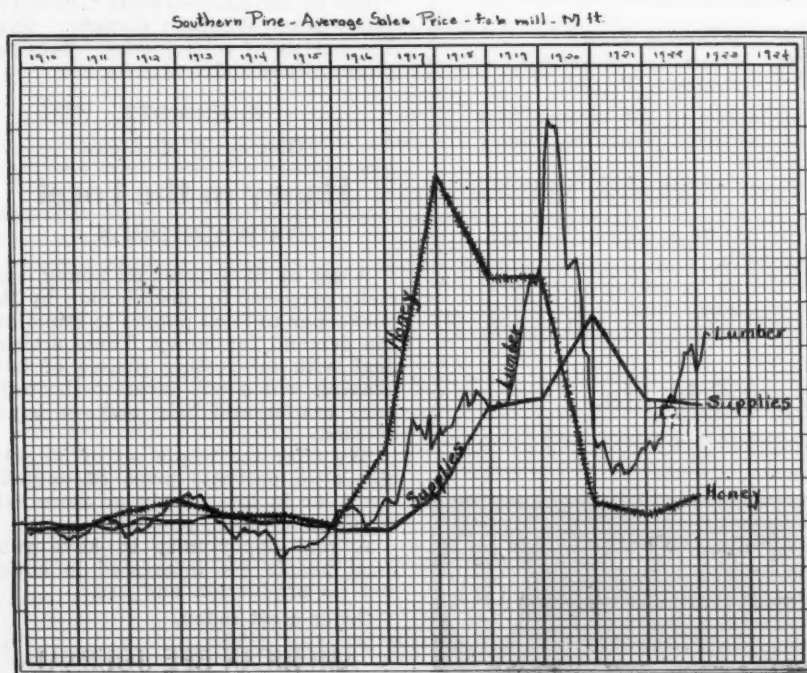


Chart B, showing comparison of honey and lumber prices.

Statistics are Interesting

Let's consider the case of the much criticised, but self-defended beehive manufacturer. I'll have to take statistics for that; because, though I'm able to defend magazine prices, and I know how paper, ink, engraving and other prices have acted, I've likely felt personally, like—well, supply prices are high—but why talk about it?

Now look at Chart B, showing lumber, honey and bee supply prices—In three years only have honey and supplies been on the same levels. Four years honey prices were the higher, and in three years only have supplies ranged above.

But the chart shows that the supply manufacturer probably made one big blunder. He didn't advance in the 1916-17 period; he should have maintained or lowered in the 1920-21 slump. Everyone is ready to buy at a bargain—no one wants to pay more than looks justifiable.

Attenuating circumstances alter many cases. You may not know it, but already lumber contracts are being considered for the material which will go into your 1924 beehives. Lumber men claim, where any large quantity is needed, it is necessary to buy at least six to nine months ahead of needs. This being the case, look at the chart again visualizing with the supply manufacturer's glasses and you can iron out many price advances and declines. Look where lumber was the first half of 1918 or 1919 or 1920.

Look at the tendency of lumber prices now, and figure the future for yourself. If the advance is maintained in lumber into the fall, what will the outcome be?

I have not taken into consideration labor and power costs which, with lumber, enter into supply costs.

**"The Lumber
That Lasts"**

FOR

**Bee Hives
Hive Bottoms
Hive Stands**

The only lumber that a well informed bee keeper will consider is genuine "ALL-HEART"

"OF COURSE" "TIDE WATER" CYPRESS "OF COURSE"
"THE WOOD ETERNAL"

"Because, why?"—

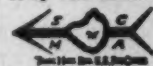
Because he has learned by experience that "All-Heart" Cypress resists rot to such a remarkable degree in all cases where extremes of weather conditions—hot or cold, wet or dry—have to be met and overcome, that it is "the only."

Write our All 'Round Helps Department, for reliable counsel on the solution of any lumber problem that's on your mind. Address

SOUTHERN CYPRESS MANUFACTURERS' ASSOCIATION
1251 Poydras Building, New Orleans, La., or 1251 Graham Building, Jacksonville, Fla.

YOUR LOCAL DEALER WILL SUPPLY YOU. IF HE HASN'T ENOUGH CYPRESS LET US KNOW AT ONCE.

Insist on "Tide Water" Cypress
—you can identify it by this mark:



THE DIAMOND MATCH CO.

(APIARY DEPT.)

**MANUFACTURERS OF
Beekeepers' Supplies
CHICO, CAL., U. S. A.**

Dadant's incomparable Foundation is always kept in stock. Western Beekeepers can be supplied advantageously.

EASTERN DISTRIBUTORS

**HOFFMAN & HAUCK, 1331 Ocean Ave.
WOODHAVEN, N. Y.**

The Diamond Match Company requires responsible agents in the Central States who are in a position to handle car load lots.

BEEKEEPERS, wherever they may be located, before deciding where to obtain supplies, should write to the Diamond Match Co. for prices and for their Beekeepers' Supply Catalog.

They own their own timberlands and sawmills, from the tree to the finished product; no middleman takes out a profit.

Full advantage of this low cost of production is given to the purchaser.

The Apiary Department (which is in charge of experienced supply men, who are also practical beekeepers) maintains a constant excellence of product and offers unsurpassed service.

ALUMINUM HONEYCOMBS

The Diamond Match Co. and their agents are the sole distributors in the United States of the Aluminum Honeycombs, manufactured by the Duffy-Diehl Co., Inc., of Pasadena, Calif. Write for descriptive pamphlets. Eastern beekeepers should send their orders for the Diamond Match Co.'s supplies to Hoffman & Hauck, 1331 Ocean Avenue, Woodhaven, N. Y.

**DIAMOND MATCH CO., Apiary Department
CHICO, CALIFORNIA**

BUSY BEE DAYS AHEAD

During swarming or robbing time you need the best labor-saving helps you can get. We list below some of the articles used in the apiary that are convenient and comfort giving

The following make beekeeping a pleasure:



ROOT BEE VEILS—Six Kinds.

An absolute necessity at times.

ROOT BEE HATS—Convenient.

Steel hoop rim makes folding possible and can be carried in the beekeeper's pocket.

ROOT BEE SUITS—Three Sizes.

Convenient when all dressed up and the bees need immediate attention. Growing more popular every year.

ROOT BEE GLOVES—Three Sizes.

Reduce the danger of being stung. They are especially for the beginner.

ROOT HIVE TOOL—Two Sizes.

The handiest article of all. You surely need it.

ROOT HIVE SEAT AND TOOL BOX.

A place for every tool and a convenient seat while examining the bees. Mighty nice to have.

When Swarming Time is Here

ROOT QUEEN AND DRONE TRAP.

The very thing for the side line beekeeper. Prevents the loss of swarms and also prevents bees from killing the queen.

ROOT ENTRANCE GUARD.

Keeps the queen in the hive, but does not trap her nor the drones. Prevents loss from newly-hived swarms and colonies being treated for disease.

ROOT SWARM CATCHER.

One of the best and most practical devices to catch swarms which have clustered in trees.

ROOT HIVE TENTS.

The best thing to prevent robbing when introducing queens, transferring or when other work has to be done. Awfully good when you need it.

Write for Catalog today

There is a Root Dealer near you who can serve you well.

THE A. I. ROOT CO.

Medina, Ohio

WEST SIDE STATION

